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THE BOOTSTRAP GAME

The impact of acquirer and target P/E-ratio –relatives on acquirer abnormal returns

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HELSINKI SCHOOL OF ECONOMICS ABSTRACT

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Objectives of the study

Practitioners put a lot of emphasis on earnings per share (EPS) accretion or dilution in mergers and acquisitions even though it rarely has an impact on cash flows. However, there are only a few academic papers that focus on this issue.

The first objective of this study is to analyse acquirer and target price-to-earnings (P/E) -ratios and the P/E-ratio relatives. If the acquirer has a higher P/E-ratio than the target, it usually results in EPS accretion. The second objective of this study is to calculate and analyse acquirer announcement period abnormal returns. Of special interest is to test whether relative P/E-ratios and thus EPS accretion or dilution have an impact on acquirer cumulative abnormal returns.

Data

The data in this study consists of 274 mergers and acquisitions, announced between 1.1.1990-31.12.2000. The data is retrieved from the Securities Data Corporation (SDC) –database. Both the target and acquirer are public listed companies and from the United States. Consensus EPS estimates from the Institutional Brokers Estimate System (IBES) are used to calculate leading P/E-ratios.

Results

This study finds surprising results that contradict a naïve practitioners' view. There is a strong correlation between acquirer and target P/E-ratios and the average target P/E-ratio post the premium paid to target shareholders is significantly higher than the average acquirer P/E-ratio. The P/E-ratio relative pre premium is evenly distributed around one and post premium below one, implying that the bootstrap game is not played. Acquirers do not try to find companies with lower P/E-ratios in order to increase their EPS.

The study also finds that acquirer cumulative abnormal returns (CAR) are negative and statistically significant. Using a five-day event window (-2+2), the acquirer CAAR is –2.8%. This study finds that the method of payment has the most significant and robust impact on acquirer CARs. Acquirer and target valuations impact the choice of the method of payment. In pooling transactions, i.e. transactions where the payment method is stock and the acquirer and target are of similar size, EPS accretion has a marginally positive effect on CARs. In other transactions, the P/E-ratio relative has a significantly negative effect on CARs. I believe that this is caused by the correlation of the method of payment and acquirer and target valuations.

Keywords: mergers and acquisitions, event study, CAR, P/E-ratio, EPS

HELSINGIN KAUPPAKORKEAKOULU TIIVISTELMÄ

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THE BOOTSTRAP GAME

Yrityskaupan ostajan ja kohteen P/E-lukujen suhteen vaikutus ostajan tuottoihin

Tavoitteet

Talousalan ammattilaiset kiinnittävät paljon huomiota siihen, miten yrityskauppa vaikuttaa ostajan osakekohtaiseen tulokseen, vaikka tällä on harvoin merkitystä yrityksen kassavirtaan. Aiheesta ei kuitenkaan ole tehty kuin muutama akateeminen tutkimus.

Tutkimuksen ensimmäisenä tavoitteena on analysoida ostajan ja kohteen ns. P/E-lukuja (P/E-luku on osakkeen hinta jaettuna osakekohtaisella tuloksella) ja yrityskaupan osapuolten P/E-lukujen suhteita. Jos ostajalle on kohdetta korkeampi P/E-luku, merkitsee se sitä, että ostajan osakekohtainen tulos kasvaa. Tutkimuksen toisena tavoitteena on määrittää ja analysoida ostajan osakkeen julkistamisajankohdan epänormaali tuotto. Erityisenä mielenkiinnon kohteena on yrityskaupan osapuolten P/E-lukujen suhteen ja siten osakekohtaisen tuloksen muutoksen vaikutus ostajan osakkeen epänormaaliin tuottoon.

Aineisto ja metodologia

Aineisto koostuu 274:ä yrityskaupasta, jotka julkistettiin 1.1.1990-31.12.2000 välisenä aikana. Sekä kohde että ostaja ovat julkisia, pörssinoteerattuja yhtiöitä ja ovat Yhdysvalloista. Aineisto kerättiin Securities Data Corporation –tietokannasta. P/E-lukuja laskettaessa käytettiin analyytikkojen konsensusennusteita IBES:stä.

Tulokset

Tutkimuksen tulokset ovat yllättäviä ja ovat vastoin "naïve practitioners' view" -hypoteesia. Ostajan ja kohteen P/E-lukujen välillä vallitsee huomattava korrelaatio. Verrattaessa ostajan ja kohteen P/E-lukujen keskiarvoja huomattiin, että kohteen P/E-luku on sen osakkeenomistajille maksetun preemion jälkeen korkeampi, kuin ostajan P/E-luku ja ero on tilastollisesti merkitsevä. P/E-lukujen suhde ennen preemiota on tasaisesti jakautunut luku yksi keskiarvona. Ostaja ei siis valitse kohdetta kohteen suhteellisesti alhaisemman P/E-luvun vuoksi.

Tutkimuksessa havaittiin myös, että ostajan julkistamisajankohdan osakkeen epänormaali tuotto on negatiivinen (-2.8%) ja tilastollisesti merkitsevä. Yrityskaupan maksutapa on tutkituista muuttujista kaikkein merkitsevin, kun tutkittiin eri tekijöiden vaikutusta ostajan epänormaaliin tuottoon. Ostajan ja kohteen arvostukset vaikuttavat merkitsevästi maksutapaan. Jos yrityskaupassa käytetään pooling-menetelmää, osakekohtaisen tuloksen muutos vaikuttaa positiivisesti ostajan epänormaaliin tuottoon. Muissa transaktioissa P/E-lukujen suhde vaikuttaa negatiivisesti ostajan epänormaaliin tuottoon. Tämä johtunee maksutavan ja ostajan arvostustason välisestä korrelaatiosta.

Avainsanat: yrityskauppa, event study, CAR, P/E-ratio, EPS

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1 INTRODUCTION

1.1 Overview

Earnings per share (EPS) is an interesting issue in business combinations. The EPS can either be accretive (increase) or be dilutive (decrease). Commonly, EPS accretion and relative P/E-ratios of the acquirer and target are used to evaluate the success of a merger or acquisition. The following text, taken from an adviser's www-site, describes well the reasoning of many practitioners when evaluating mergers and acquisitions.

> "P/E ratios are an important consideration in determining how much an acquiror can afford to pay for an acquisition. Because investors are intensely focused on EPS growth, acquirors will attempt to structure acquisitions that are, at worst, dilutive in the short-run and neutral to projected EPS within a year or so of closing.
>
> In effect, the maximum price which an acquiror can pay which results in no EPS dilution is the buyer's P/E ratio multiplied times the seller's estimated pro forma net income.
>
> Thus, acquirors with a "high" P/E ratio can pay a higher price for an acquisition than an institution with a "low" P/E ratio. If stocks used to consummate an acquisition represent a currency, then the buyer's P/E ratio reflects the relative strength of the currency. The increase in bank acquisition prices during 1997 to over 19x earnings can thus be explained by the increase in the acquirors' P/E ratios in the public markets."
>
> Bankval.com – Mercer Capital Management (1997)

Practitioners have a strange view of putting a lot of emphasis on earnings per share (EPS) and price-to-earnings (P/E) -ratio in a merger or acquisition. Practitioners and managers claim that investors use EPS and P/E to evaluate companies and to form their investment decisions and thus companies should care about an artificial change in EPS due to a business combination. There are even academic papers where formulas are derived for the maximum P/E-ratio that

the acquirer can pay without diluting EPS (e.g. Larson and Gonedes 1969, Roy 1988). The financial theory tells us that the artificial change in EPS due to an acquisition does not matter as it does not affect valuation. In valuation, it is cash flow what counts and EPS accretion is merely an accounting issue.

There are three different sources of EPS accretion or dilution in a business combination (Andrade (1999)): relative P/E-ratios, choice of accounting and acquisition financing. The first, and most important one, is the relative P/E-ratios of the target and acquirer. Weston (1966) explains that EPS accretion that happens due to a merger is because of the differences in the growth rates of the target and acquirer. If the target has a higher P/E-ratio, the transaction will dilute acquirer EPS, and if the acquirer has a higher P/E-ratio the transaction will be accretive to the acquirer's EPS. Companies that have high P/E-ratios can repeatedly buy other companies with lower P/E-ratios and experience continuously increasing EPS. Brealey and Myers (2000) call this effect the bootstrap game. The second source of EPS accretion or dilution is the choice of accounting. During the time period used in this study, the acquirer could choose from the pooling and purchase accounting methods. The difference of pooling and purchase accounting is that in pooling accounting the assets of the target and acquirer are combined at their book values and the premium paid to target shareholders over the book value is not included in the assets. In purchase transactions, the premium is included as goodwill or as an asset step-up, which have to be amortised or depreciated. This extra amortisation or depreciation dilutes future EPS, and thus, EPS for pooling acquisitions is usually higher. The third source of EPS accretion or dilution is the choice of financing. If the acquisition is financed with debt, the extra interest payments might dilute future EPS.

The practitioners' view of evaluating the benefits of mergers and acquisitions through EPS accretion or dilution or relative P/E-ratios is fundamentally wrong. Mergers should be evaluated by their NPV (see e.g. Brealey and Myers (2000, pp. 950-952). EPS accretion should not matter and if a company acquires another company with a lower P/E-ratio and thus experiences increased EPS, it cannot be stated that this transactions was beneficial just because of that. However, the press and corporate managers often state such issues. A recent article in Helsingin Sanomat (26.1.2003) listed Finnish companies that might be take-over candidates because they had lower P/E-ratios than the global average P/E-ratios. The comment from Daniel Kaplan (1996) reveals the reasoning behind practitioners' strong focus on EPS:

> "People have been saying forever that the real measure of performance and a company's value is cash flow and not earnings per share. Unfortunately, companies in many industries are valued on an earnings multiple and are therefore punished through lower stock values for using purchase accounting"
>
> Kaplan (1996)

Many believe that investors are fooled by any artificial EPS accretion or dilution and will blindly capitalise this accretion or dilution by the company's P/E-ratio. Thus, if the acquirer's former EPS of €1.00 increases by, say, 20 percent, and the acquirer has a P/E-ratio of ten, the share price should increase by €2.00. This reasoning is not valid as the growth rate of the company decreases simultaneously, decreasing the P/E-ratio. If the practitioners' view is correct, it should be observed on the market as higher returns for acquirer shareholders when an acquirer is buying a company with a lower P/E-ratio.

1.2 Previous research

There are only a few studies that look directly at EPS-impact and its relation to shareholder returns. Andrade (1999) finds a significant positive relationship between EPS accretion and acquirer shareholder returns both at announcement and in the long run. The study by Andrade (1999) is the only one that looks at announcement period returns and EPS accretion or dilution directly. Harding and Yale (2002) find in their study that the proportion of successful transactions in the long term is bigger in a dilutive group than in an accretive group. Rau and Vermaelen (1998) study the long-term performance of acquiring firms and, as part of their study, test whether the long-term abnormal return is related to an EPS acquisition impact but they do not find any statistically significant results.

The pooling versus purchase controversy is researched widely. The pooling versus purchase accounting question is an interesting issue as the choice of accounting only affects the reported EPS and not cash flows and thus should not impact shareholder returns or valuation. Lys and Vincent (1997) show that the management of the acquiring company is even willing to incur extra costs to qualify for pooling accounting. Many others find that transactions, which are accounted for as pooling pay a higher premium than other transactions and that the

choice of pooling is related to the underlying goodwill and thus underlying EPS dilution of the target (e.g. Aboody et al. (2001), Nathan (1988), Robinson and Shane (1990) and Ayers et al. (2002)). Hong et al. (1978) and Davis (1990) find that the market does not respond more positively to pooling transactions, i.e. the market does not prefer transactions that are increasing EPS artificially. Interestingly, Hopkins et al. (2000) find that analysts are fooled by the accounting choice and they value companies using the pooling accounting method in transactions higher. Jennings et al. (1996) find that goodwill is valued as an asset and goodwill amortisation decreases the value. Vincent (1997) finds that pooling firms enjoy a premium on valuation over purchase firms. However, Lindenberg and Ross (1999) contradict this result and find that pooling does not result in higher valuation.

The previous research is quite mixed on what impact an artificial change in EPS has on shareholder wealth. The practitioners and managers seem to be confident that the market blindly uses reported EPS to valuation purposes. Thus, practitioners believe that by buying companies with lower P/E-ratios and increasing reported EPS, a company can increase its share price and shareholder returns. The market reaction to artificial EPS increases seems to be either slightly positive or zero. Thus, the practitioners' extensive focus on EPS accretion or dilution cannot quite be justified.

1.3 Research problem

The purpose of this study is twofold. First, the purpose is to look if the practitioners' view is actually dominant in acquisitions. The naïve practitioners' view suggests that companies do not acquire other companies with higher P/E-ratios as it results in EPS dilution. Thus, the average acquirer P/E-ratio should be much higher than the average target P/E-ratio and the P/E-ratio relative should be distributed above one. The P/E-ratios are also studied further and especially the distribution of the P/E-ratio relative i.e. the acquirer P/E-ratio divided by the target P/E-ratio. Second, the abnormal returns to acquirer shareholders are calculated and analysed. The most interesting idea of this study is to test whether EPS accretion results in higher shareholder returns. If the naïve practitioners' view is justified, acquirer abnormal returns should be dependent on EPS accretion or dilution.

1.4 Structure of the study

This study is structured in two parts. The first part is the theoretical part, covering the related theoretical framework, previous research related to the study and formulating the hypotheses. The second part is the empirical part of the study, which begins by describing the data, variables and methodology used in the study and continues with the description of the results of the empirical study and with the discussion of results and conclusion.

The second chapter first defines a few key variables that are central in the study. Then it describes the relevant theoretical framework on the EPS accretion and dilution and P/E-ratios in mergers i.e. what EPS accretion and dilution means and what affects it. The last part of the second chapter covers previous empirical research that is relevant to this study. Building on the theoretical background presented in Chapter 2, the third chapter finalises the theoretical part by discussing the hypotheses that are used in the study.

The empirical part is divided into two chapters, Chapter 4 and Chapter 5. Chapter 4 first describes the data and defines the variables used and then it discusses the methodologies used in the study. Chapter 5 reports the empirical results of the study. Chapter 5 is divided into four parts. The first part contains the descriptive statistics and the second part analyses the P/E-ratios and the P/E-ratio relatives. The third part of Chapter 5 describes the acquirer abnormal returns and the fourth part reports the analysis of CARs. Chapter 6 concludes.

2 THEORY

2.1 Definitions

2.1.1 Price-to-earnings -ratio

There is one central multiple that is used throughout this study and should be defined at this stage. The price-to-earnings (P/E) -ratio is key to this study so even though it is well known it is so central that it is defined here.

$$Price-to-earnings \quad (P/E) = \frac{Share\ price}{Earnings\ per\ share} \tag{1}$$

The P/E-multiple can be either a lagging multiple or a leading multiple. A lagging multiple means that the current share price is divided by historical, reported earnings, whereas a leading multiple is using earnings estimates instead of reported earnings.

2.1.2 Earnings accretion and dilution

Practitioners, meaning corporate executives, bankers and the financial press, extensively focus on earnings per share (EPS) and in mergers or acquisitions they focus on the impact that the combination will have on the acquirer's EPS. Below is a recent example of a typical press commentary discussing the financial aspects of a transaction:

> "While Office Depot expects this transaction generally to have little impact on earnings in 2003, depending upon timing of the closing, risks of the integration progress and other risks and uncertainties, the transaction could be slightly dilutive to earnings in 2003. It is expected to be accretive to earnings thereafter. In 2004, the acquisition is anticipated to be accretive by 5% to 10%"
>
> Business Wire (2003)

This text is the only part of the article (apart from the article mentioning the total consideration paid for target shareholders) that discusses the financial implications of the transaction. There is no mentioning of cash flows or possible synergies that, according to financial theory, might be of interest to the investors. Another example of practitioners' logic is an article discussing News Corp's acquisition of Hughes Electronics. The following is the only mentioning in the article about the capital market's view on the transaction:

> "Investors responded with initial caution to the transaction, however, sending shares in News Corp down by almost 10 per cent in early trading. This reflected concerns that the deal will be dilutive to earnings in the short term, with the financial benefits from DirecTV only expected to show from 2006."
>
> The Independent (2003)

EPS dilution or accretion means that in a merger or acquisition the acquirer's earnings will be either diluted (decrease) or accreted (increase) by the transaction. The issue of EPS accretion was already discussed in the late 1960s. Weston (1966 and 1968) criticised the practice of evaluating mergers only by their impact on EPS and showed that EPS accretion results from the differences in P/E-ratios and has no impact on value. Silberman (1968) emphasised that assessing mergers should not only be limited to evaluating the effect on earnings per share but to include the analysis also to future cash flows, cost of capital and capital structure.

I use a definition of EPS accretion and dilution or EPS impact that is from a training manual of an investment bank and is consistent with the definition used by Andrade (1999). The practitioners' view is used to be consistent with the market's perception of accretion and dilution. EPS impact is defined calculating the new EPS and divided it by the old EPS. The new EPS is defined as:

$$New\ EPS = \frac{Acquirer\ earnings + Target\ earnings - After\ tax\ cost\ of\ acquisition\ debt - Incremental\ D\&A}{Acquirer\ shares\ outstanding + New\ acquirer\ shares\ issued} \quad (2)$$

After tax cost of acquisition debt means the interest payment of any possible debt raised to finance the transaction. It is after tax as the interest is paid before tax and gives thus a tax shield to the company. Incremental D&A means the extra depreciation and amortisation that results from the premium paid over the book value of the target. The target's assets are

recorded on the buyer's books at market values and the price over the market value of the assets is recorded as goodwill in the acquirer's books. The asset step-up increases depreciation and the goodwill has to be amortised ratably.

The EPS formula is the formula in general format. It will change depending on the structure of the deal. If the deal is financed totally by debt (or cash), there will be no new shares issued. If the deal is a stock-for-stock transaction, there is no debt associated with the merger and thus no cost of debt is included. If the transaction is accounted for as pooling, there is no extra depreciation and amortisation charge.

There are three sources of accretion or dilution (see Andrade (1999)):

- Relative P/E-ratios (described in Section 2.2.1)
- Accounting for combination i.e. pooling versus purchase (described in Section 2.2.2)
- The choice of financing e.g. cash versus stock (described in Section 2.2.3)

2.2 Relative P/E-ratios and EPS accretion and dilution

2.2.1 The bootstrap game

In the 1960s there were a lot of conglomerate companies that made acquisitions without any economic gains. However, these conglomerates experienced increases in EPS for several years (see Andrade (1999), Brealey and Myers (2000, pp. 947-949) and Weston et al. (2001, pp. 190-191)). Brealey and Myers (2000) call this effect the bootstrap game. If a company buys another company, the acquisition can be earnings accretive without making any economic sense. The increase in earnings is due to the differences in expected growth rates for the two merging companies. Thus, the bootsrap game can be used to increase earnings per share. The EPS accretion is illustrated by a simple example below. The example follows Brealey and Myers (2000) and Andrade (1999).

In this example, there are two similar companies, A and B. Their relevant financials are given in Table I. Company A decides to buy company B in a stock-for-stock transaction. Company A's market value is twice as high as company B's market value and as they have the same

amount of shares company A's shares are valued twice as high as company B's. Company A can thus acquire company B by giving one share for each two company B shares to B's shareholders. The new number of shares will be 150 shares after the merger and the net total earnings will be company A's earnings plus company B's earnings before the merger i.e. €200. The EPS before the merger for both companies is €1.00 but company A is valued higher and has thus a higher P/E-ratio. The EPS of the merged company increases by 33% just because of the merger even though in this example there is no economic value added and no premiums or synergy effects considered. The market value of the combined company is just adding the market values of both A and B. The total number of shares increase by 50 percent as company B is trading with a P/E-ratio that is half of what company A is trading at. The earnings double because of the merger and because shares only increase by half, EPS increases by 33 percent.

Table I

The EPS impact of a stock-for-stock acquisition

This table shows the impact that a stock-for-stock acquisition has on EPS. The example assumes no premium over market value. It also assumes that the market value equals the book value so that there will be no goodwill or asset step-ups. Company A that has a higher P/E-ratio acquires company B and this acquisition increases the combined company's EPS by 33%.

	Company A	Company B	Combined A + B
Total earnings	€ 100	€ 100	€ 200
Share price	€ 20	€ 10	€ 20
Number of shares	100	100	150
Market value	€ 2,000	€ 1,000	€ 3,000
EPS	€ 1.00	€ 1.00	€ 1.33
P/E	20	10	15

A company that has a high relative P/E-ratio can thus increase its earnings by buying companies that have lower P/E-ratios. The market expects that the company is growing faster than other companies and thus has a higher P/E-ratio.[1] If the investors do not realise that the

[1] The P/E-ratio is related directly to the growth rate of the company. Two companies with identical earnings but different growth rates will have different P/E-ratios. Copeland et al. (2000, p. 66) show that the P/E-ratio can be written as

$$P/E = \frac{1 - g/r}{k - g},$$

where
g = the long term growth rate in earnings and cash flow
r = the rate of return of new investment
k = discount rate

company is buying slower growth the company might be able to show increasing EPS figures and claim that it is a result of value creation in the merger.

Practitioners focus much on EPS dilution or accretion and with every merger analysis the management's advisors usually make an EPS impact analysis. The press also focuses rather much on how much the transaction will affect EPS. There is a wide belief among practitioners that companies should not acquire other companies with higher P/E-ratios. However, already Weston (1966) showed that the EPS dilution should not matter if the growth rate of the target exceeds the growth rate of the acquirer. What acquirers think is that if they have a relatively higher P/E-ratio, they can acquire the other company cheaper. The problem is that if the acquirer is trading at 20 times earnings and the target is trading at 10 times earnings the company can buy cheaper earnings but then the growth rate is lower and thus the P/E-ratio should also decrease after the merger.

There is often fuzzy logic used when evaluating transactions and their implications with EPS and P/E-ratios. By using the figures from the example in Table I the following example is the most surprising and a quite common conclusion of EPS impact. As A's EPS increases by €0.33 due to the acquisition, investors will capitalise this increase with A's P/E-ratio of 20 times earnings. This means that company A's share price would increase by €6.6 to €26.6 (see e.g. Lys and Vincent (1995), Weston et al. (2001, pp. 190-191)).

2.2.2 Purchase vs. pooling accounting in the US

The pooling-of-interest method of accounting in business combinations was eliminated by the Financial Accounting Standards Board (FASB) in the US in 2001 (FASB (2001)). After June 30, 2001 all business combinations in the US have to be accounted for using the purchase method of accounting. The pooling-accounting method was allowed in the US during the time period used in this study. As the pooling method is relevant during the time period of the study, it is discussed as it was prior to June 2001.

Pooling and purchase transactions differ by the method of accounting. In general terms, in a pooling transaction the assets of the merging companies are combined at their book values, whereas in purchase accounting the difference of the target's purchase price and book value

of assets is recorded on the acquirer's balance sheet as goodwill. Thus, in pooling transactions the balance sheet of the combined company will not change much after the transaction, all accounting items will be a sum of the combining companies' balance sheets. In purchase accounting, the target is recorded on the buyers' financial statements at the value actually paid. The target's identifiable assets are recorded at their current market values on the buyer's books so there will usually be a step-up to the previous book values of the target's assets. The difference of the market value of assets and the purchase price will be recorded as goodwill on the buyer's balance sheet. The step up to the market values of identifiable assets has to be depreciated according to plan and the goodwill has to be written off over some reasonable period of time but no longer than 40 years. Because of the extra depreciation and goodwill amortisation, pooling will usually result in a higher reported net profit.

The pooling accounting method is usually very regulated and in order to qualify for pooling there is a set of criteria that has to be satisfied. If these criteria are met, the transaction is a merger between companies of comparable size and the pooling of interests –accounting method is applied. The criteria in the US included limitations to sales of assets and issuance or purchase of own stock but the most important criteria was that most (over 90%) of the consideration paid to target shareholders had to be the acquirer's own stock i.e. pooling transactions were mostly stock-for-stock transactions.

Table II shows an example of a transaction where company A acquires company B that is the same size and they have the same P/E-ratios. The transaction is recorded as purchase, which means that company B is recorded on A's accounts at the purchase value of €1,000. B's book value of assets is €800 and it is assumed that it represents the market value of those assets, so the extra €200 is recorded as goodwill. If the assets of B are worth more than their market value, the assets are valued at their market value in A's books and the extra step-up in assets has to be depreciated.[2] In this example, however, all the value difference is recorded as goodwill and amortised over a period of ten years.

[2] If, in the example, the assets would have been worth €900, the goodwill would be €100 and the book value of B's assets would increase by €100. This increased asset base would increase depreciation. The difference between depreciation and amortisation is that depreciation is usually tax deductible and amortisation is not, but goodwill can be amortised over a period of 40 years time when assets must be depreciated in a shorter period, depending on the asset. If the €100 in this example had to be depreciated in 5 years, it would result in a dilution of €100/5*(1-30%)=€14 compared to €10 of goodwill amortisation.

Table II

The dilutive effect of goodwill amortisation on stock-for-stock acquisitions

Table II shows an example of company A acquiring company B and recording the transaction as purchase. Both companies are of the same size and have the same P/E-ratio for simplicity. The book value of company B's assets represent the market value so the difference between market value and book value is all recorded as goodwill, which is then amortised over 10 years. If the transaction had been reported as purchase the EPS would have been the same as before but now the goodwill amortisation dilutes EPS by 10%.

	Company A	Company B	Combined A + B
Total earnings	€ 100	€ 100	€ 200
Share price	€ 10	€ 10	€ 10
Number of shares	100	100	200
Market value	€ 1,000	€ 1,000	€ 2,000
Book value	€ 800	€ 800	€ 1,800
Goodwill			€ 200
EPS	€ 1.00	€ 1.00	€ 0.90
P/E	10	10	11

This amortisation results in a decrease in EPS of ten percent. If the transaction had been recorded as pooling the assets would just have been combined and the EPS would have remained unchanged. The disadvantage of purchase accounting is that the whole amount paid to the target shareholders is recorded in the accounts of the combined company and the extra goodwill amortisation or asset depreciation can dilute future earnings. In later sections we will see in the light of previous research if the accounting for business combinations actually matters for investors.

2.2.3 Acquisition financing

An acquisition can be a stock-for-stock acquisition, a cash acquisition or anything in between. The acquirer has to make a choice of financing and there are many issues that affect the financing choice. Weston et al. (2001, pp. 213-214) look at mergers in the 1990s and conclude that the bigger deals are mainly stock-for-stock and in the smaller deals the method of payment is likely to be cash. In their sample, cash deals account for approximately 22 percent of all mergers. Their conclusion seems very logical as if a company makes an acquisition with cash it will usually have to raise the cash through issuing debt. If the acquisition is large in proportion to the acquiring company, the acquirer's capital structure changes and the

probability of bankruptcy increases but if the target is small the acquisition can be made with cash without altering the capital structure.[3]

If an acquisition is financed partly or completely by cash or preferred shares the interest payments of the debt will dilute the earnings of the combined company. Table III shows an example of a transaction that is financed 50 percent by stock and 50 percent by debt. For simplicity, the acquisition is with no premium to market value. It is also assumed that the asset book values represent their market values and thus there is no step-up depreciation and no goodwill.

Table III

EPS dilution when the acquisition is partly debt financed

This table gives an example of EPS dilution when an acquisition is financed by debt. In this case, the acquisition is financed 50% by shares and 50% by new debt. The assumed tax rate is 30% and the interest rate on the new acquisition debt is 15%. The table shows company A and company B as stand-alone entities and the combined entity after company A has acquired company B. Total earnings is pre interest payments on debt. The share price rises by 10% because of the value of the tax shield created by the acquisition debt.[4] The EPS is diluted by 2% because of the extra interest payments of the acquisition debt that decrease the combined company's earnings.[5]

	Company A	Company B	Combined A + B
Total earnings	€ 100	€ 100	€ 147.5
Share price	€ 10	€ 10	€ 11
Number of shares	100	100	150
Market value	€ 1,000	€ 1,000	€ 1,650
Acquisition debt			€ 500
Value of tax shield			€ 150
Enterprise value	€ 1,000	€ 1,000	€ 2150
EPS	€ 1.00	€ 1.00	€ 0.98
P/E	10	10	11

In Table III, the example shows that the extra interest payments associated with the debt used to finance the acquisition dilute future EPS by two percent. The acquisition of €1,000 is

[3] The capital structure choice is discussed in Brealey and Myers (2000, pp. 499-539). An empirical study of the costs of bankruptcy is made by Weiss (1990). He found that the costs of bankruptcy amounted to 20 percent of the value of equity.

[4] The tax shield is assumed to be permanent. The interest payments create a tax shield, which lowers the taxes paid by the interest paid times the tax rate. This value is then discounted to eternity with the cost of debt (see Brealey Myers (2000)).

[5] The new EPS is calculated by:

$$EPS = \frac{A\ Earnings + B\ Earnigns - After\ tax\ cost\ of\ acquisition\ debt}{Acquirer\ no.\ shares + New\ shares\ issued} = \frac{100+100-500\times 0.15\times(1-0.3)}{100+50}$$

(see Equation (2))

financed by issuing new shares to target shareholders worth €500 and issuing debt worth €500. The interest rate is assumed to be 15 percent and the tax rate is 30 percent. The enterprise value of the combined company is the combined enterprise value of the two companies plus the increase in value due to the tax shield that the acquisition debt creates.

2.2.4 EPS accretion and dilution in relation to P/E-ratio

The choice of accounting and the choice of financing both influence the EPS accretion or dilution. Goodwill amortisation can be substantial but it is usually divided to such a long time period that it mitigates the effect. Any possible dilution due to interest payments of acquisition debt is related to the interest rate of the debt. If the acquisition is financed fully with debt, the deal will be accretive or dilutive depending on the target's return (before tax) on equity and the interest rate of the acquisition debt (see Equation 2). The accretion or dilution due to the interest payments or goodwill amortisation can be large but they are also difficult to measure accurately. The idea of this study is to look at the differential P/E-ratios as a proxy for the EPS accretion or dilution. This is also because the practitioners believe that companies are valued on a P/E-ratio and a company should not acquire companies with lower P/E-ratios.

Table IV

The influence of P/E-ratios on EPS accretion

This table shows the EPS accretion with two different financing options. In the first option (column 4), company A acquires company B with stock and in the second option (column 5) company A acquires company B with cash. The cash transaction is financed with a debt issue, where the interest rate is 8%. The resulting EPS accretion is positive for both transactions but it is slightly higher for the cash transaction as the target's return on market equity is 10% and the acquisition debt is 8%. The tax shield is calculated as in Table III.

	Company A	Company B	A + B All stock	A + B All cash
Total earnings	€ 100	€ 100	€ 200	€ 200
Share price	€ 20	€ 10	€ 20	€ 23
Number of shares	100	100	150	100
Market value	€ 2,000	€ 1,000	€ 3,000	€ 2,300
Acquisition debt				€ 1,000
Value of tax shield				€ 300
Enterprise value				€ 3,300
EPS	€ 1.00	€ 1.00	€ 1.33	€ 1.44
P/E	20	10	15	16

Table IV shows an example of an acquisition using two different payment methods. The transaction is financed either completely by stock or cash. The cash transaction is financed by a debt issue with an interest rate of eight percent. The target's return on market equity is ten percent so the after tax interest payment is less than the earnings of company B and this will increase EPS. The majority of the EPS increase, however, comes from the difference in P/E-ratios. So if a company wants to increase its EPS by an acquisition, the best way is to acquire a company with a much lower P/E-ratio.

2.3 Previous empirical research

2.3.1 EPS accretion/dilution studies

The previous empirical research concentrates on accounting studies and specifically on the choice of pooling or purchase accounting. There are only two recent academic papers and one article that take a similar view and can be considered as precedents to this study. These papers study the bootstrap game hypothesis or are closely related to it. The three studies are described in this section and the following section describes the accounting studies in more detail.

In their study of post-acquisition performance Rau and Vermaelen (1998) find that acquirers with high book-to-market –ratio i.e. glamour acquirers, contribute most to the average negative post-acquisition performance of acquiring firms. They perform much worse than value acquirers, with low book-to-market-ratios, do. As one hypothesis they use the bootstrap game (or earnings myopia, as they call it) as one of the determinants of post-acquisition underperformance of glamour firms. They believe that glamour firms have higher P/E-multiples and are also more likely to exhibit EPS fixation. They calculate an EPS impact equivalent to EPS accretion and then divide their sample to three categories, low-, medium- and high-EPS-impact. They test the long-term performance of these groups and find that the results are statistically insignificant for abnormal returns. They also look at the P/E-multiples directly and find that the proportion of bidders having a higher P/E-multiple than the target is larger in the best performing group as the proportion of bidders having a higher P/E-multiple in the worst performing group. The results are, however, not statistically significant and they

do not test for the differences in the two groups. The data used by Rau and Vermaelen (1998) is from January 1980 to December 1991.

Andrade (1999) studies the impact that EPS accretion and dilution has on the abnormal return of stock prices both at announcement and after a longer period. He explains that practitioners put a lot of emphasis on EPS accretion and dilution and they claim that dilutive deals are not perceived well by the market as they decrease the reported earnings. Andrade (1999) hypothesises that this EPS anomaly should be reflected in announcement and long term abnormal returns. He finds that EPS accretion has a positive and significant impact on acquirer returns at announcement. He also finds that EPS accretion is positively related to shareholder returns for as long as 18 months. Andrade (1999) concludes that EPS accretion is positively related to shareholder returns but the magnitude of the relationship is not as large as implied by the amount of emphasis that practitioners put on EPS accretion and dilution. Andrade (1999) also controls that the abnormal return is not from improved profitability and finds no evidence thereof. He also looks at the choice of accounting and reports that choosing the pooling accounting method can improve acquirer earnings. The data that Andrade (1999) uses includes 224 transactions, completed between January 1975 and December 1994.

An article contradictory to the findings of Andrade (1999) is by Harding and Yale (2002). Harding and Yale (2002) examine 100 acquisitions from 1996 to 2000. They divide acquisitions into dilutive, neutral and accretive, and calculate the percentage of acquirers that outperform their industry's average stock return by more than 10 per cent one year after the announcement. Harding and Yale (2002) find that there are more companies outperforming their industry in the dilutive group than there are in the accretive group. Although the methods used and the scientific merits are slightly weak, this study is still very interesting. Harding and Yale (2002) claim that dilutive deals are actually good because of the discipline that they bring. The fact that the market is suspicious of dilutive deals accounts for the fact that companies making dilutive deals are under tougher scrutiny. Thus, managers feel pressed, whereas accretive deals boost EPS without management involvement.

2.3.2 Purchase vs. pooling accounting studies

There is a lot of research that is focused on merger accounting and namely purchase versus pooling accounting. In purchase accounting the assets of the target are written up to their market value and the difference between the purchase price and the value of the assets is recorded as goodwill. The goodwill is then depreciated every year for the effective period or some maximum number of years. Pooling accounting is a pooling of assets where the assets of both the companies are just combined at their book values. Pooling accounting is no longer allowed in the US but it was allowed during the time period of this study. Pooling will usually give a higher reported EPS as most acquisitions are made with a price above target book value and the goodwill amortisation each year will dilute EPS.

The pooling versus purchase research is important even though the accounting choice is not the only source of accretion or dilution and even though pooling accounting is no longer allowed in the US. It gives evidence on how the market reacts to changes in EPS when the change is merely cosmetic and a result of the choice of accounting. Purchase versus pooling accounting is an easy way of studying this effect, as the choice between pooling and purchase has no impact on cash flows and should be easily distinguished by the market. Still, some research shows that companies are even willing to pay extra to be able to qualify for pooling and avoid the EPS dilution associated with amortisation of goodwill. If companies are in fact willing to pay for pooling and the market reacts more positively to pooling transactions it seems that the market is concentrated on artificial EPS accretion and dilution. This would imply that the practitioners' view is true and that companies should make transactions that increase EPS. The market should then also react more positively to pooling than purchase transactions and this should be observable in the announcement period returns to acquirer shareholders.

Lys and Vincent (1995) study AT&T's acquisition of NCR in 1991. They find that even though the merger initially did not qualify for pooling, by incurring more costs AT&T did succeed to qualify for pooling accounting. The benefit of the pooling treatment was that AT&T's EPS would increase by roughly $0.45 or 17% but it would not have any cash flow impact. Lys and Vincent (1995) state that AT&T paid a documented $50 million and possibly as much as $500 million in order to qualify for pooling. The company claimed that pooling of

interests was essential to the success of the acquisition as investors and analysts would otherwise penalise AT&T in the future for lower earnings. One AT&T spokesman told Lys and Vincent (1995) that AT&T believed investors would capitalise the company's accounting earnings. The approximately $0.45 increase in accounting EPS due to pooling would, with AT&T's P/E-ratio of 15, result in a $5-$7 value increase per share. The market reacted quite negatively to the acquisition and Lys and Vincent (1995) analyse that the decrease in AT&T shareholder wealth was as much as $6.5 billion and negative synergies from the merger were as much as $3.0 billion. Clearly, the management of AT&T thought that pooling would be beneficial and the artificial increase in EPS was worth paying for.

Aboody et al. (2000) study the choice between purchase and pooling accounting and concentrate on non-capital market explanations of managers' preference for pooling. They find that the choice of pooling accounting is greatly influenced by the magnitude of the premium over the book value of the target i.e. the amount of underlying goodwill. They also find that the likelihood of pooling decreases with the acquirer's debt-to-equity –ratio. They do not find evidence that stock-based compensation or job security of the acquirers' CEOs have an impact on the choice of pooling. However, if the premium over target's book value is large, acquirers' CEOs with earnings-based compensation plans are more likely to incur costs of qualifying for pooling.

There are also other studies that prove that companies are willing to incur costs in order to qualify for pooling. Some studies have concentrated on measuring the bid premium in pooling and purchase transactions. Robinson and Shane (1990) and Ayers et al. (2002) both find that companies applying pooling pay a higher acquisition premium over the market value than companies applying purchase accounting. Ayers et al. (2002) estimate that the premium for pooling mergers is about 10 percent of the acquisition premium over mergers using purchase accounting. Nathan (1988) finds the offer premium is negatively correlated with underlying goodwill but acquirers continue to pool when it maximises net profit.

The evidence from previous research implies that companies are willing to pay extra to be able to account transactions as pooling and thus eliminate EPS dilution in the form of goodwill amortisation. Next we will look at accounting studies that concentrate on the market's i.e. investors' view of pooling versus purchase accounting.

The studies discussed above were more concentrated on the manager preference on accounting, but there are also many studies that look at the preference of investors, i.e. the market reaction, to pooling versus purchase transactions. The market reaction to the choice of pooling versus purchase was first studied by Hong et al. (1978). They studied a sample of mergers where there would be a depreciation and amortisation charge that would affect the reported earnings if accounted for as purchase. If the accounting was accounted for as pooling the earnings would not be decreased by amortisation and thus pooling companies reported higher earnings even though it had no impact on cash flows. Hong et al. (1978) wanted to find out if investors were fooled by this net income effect. They found that mergers, which used the purchase accounting method earned significant positive abnormal returns in the period surrounding the merger whereas the transactions that were pooling transactions did not earn any significant abnormal returns. Davis (1990) re-examines the study done by Hong et al. (1978) but uses a different sample and time period. Davis (1990) finds similar results where the whole sample has no significant cumulative abnormal returns. Mergers that are made with the purchase method exhibit significant positive cumulative abnormal returns and the abnormal returns of the pooling transactions are not significant. He also finds – in line with Nathan (1988) – that when paying more for the equity in relation to the book value of the company the transaction is more likely to be pooling. This suggests that if a company has to amortise a lot of goodwill the company wants to use pooling not to dilute earnings. Andrade's (1999) found in his study described above that pooling could improve acquirer returns, which is contradictory to the Hong et al. and Davis studies.

Hopkins et al. (2000) study buy-side analysts' stock-price judgements related to the accounting method of the business combination. They find that analysts value companies that use the purchase accounting method and ratably amortise goodwill lower than companies that use the pooling method. Companies that have written off the goodwill immediately are also valued higher than companies that use the purchase method and amortise goodwill ratably. Hopkins et al. (2000) also study the timing of the business combination by changing the acquisition to occur three years before the current fiscal year instead of one year. The stock price estimates are lower when the acquisition has happened three years before the current fiscal year, and, in addition, lowest when the company has used the purchase method and amortises goodwill ratably. Hopkins et al. (2000) conclude that analysts do appear to include the amortisation charge in their net income calculations when it is a purchase acquisition and especially when the transaction has happened earlier in the past. In contrast, when the

combination is accounted for as pooling, analysts do not include an amortisation charge for the goodwill paid. It seems that analysts are fooled by the choice of accounting and it would imply that EPS dilution is an important issue. If analysts, who should be professionals in valuing companies, do value mergers using pooling accounting higher, why should not investors do the same. Furthermore, these analysts are an important input to institutional portfolios.

Other than event studies observing market reaction on pooling versus purchase accounting are studies that look at the valuation of goodwill and if there is a relation between reported goodwill and stock prices.

Jennings et al. (1996) study the relationship between accounting goodwill numbers and equity values. They study how the reported goodwill and goodwill amortisation relate to market values of companies. Jennings et al. (1996) find that there is a strong positive association between recorded goodwill and equity values, after controlling for other net assets. They also find some evidence of negative association between goodwill amortisation and equity values. However, this evidence is weak and the results suggest that the relationship varies greatly across firms. Jennings et al. (1996) conclude that based on their evidence, investors value purchased goodwill as an asset i.e. economic resource. For some companies, investors clearly view goodwill as an asset that declines in value, but for others, goodwill does not decline in value at all. If goodwill amortisation depresses equity values, as found on some companies, these companies could maximise shareholder wealth by using the pooling method, but for others the accounting choice in business combinations should not matter at all.

Vincent (1997) approaches the same issue by studying whether the choice of pooling versus purchase accounting in a business combination has any implications on valuation. Vincent finds evidence that pooling firms enjoy a premium on valuation over purchase firms. She finds that the goodwill in purchase accounting combinations is valued as an asset and that the goodwill amortisation is valued as an expense. However, her ratio analyses indicate that the higher price of pooling firms cannot be linked to the expense when amortisation of goodwill under purchase accounting. Interestingly, she analyses P/E-ratios for both pooling and purchase accounting firms from zero to five years post business combination and finds that pooling firms are valued with a higher P/E-multiple than purchase firms in the time period surrounding the business combination. In later years, pooling and purchase accounting firms

are both valued with similar P/E-ratios, regardless of lower earnings reported in purchase accounting. Pooling P/E-ratios are also higher when the P/E-ratios are adjusted so that pooling transactions as purchase transactions and vice versa.

Lindenberg and Ross (1999) find that the market reacts negatively to pooling transactions and neutrally or positively to purchase transactions. They also study if goodwill amortisation affects valuation using P/E-ratios and EBITDA (earnings before interest, tax, depreciation and amortisation) –multiples. Goodwill amortisation affects earnings and thus the P/E-ratio but it does not affect EBITDA and thus EBITDA multiples should be in the same range with companies in the same industry but P/E-ratios should not. Lindenberg and Ross (1999) find that companies with goodwill have higher P/E-ratios but they do not have higher EBITDA multiples.

2.3.4 Summary of previous research

Previous literature is slightly confused on whether EPS accretion and dilution in a business combination has actually any effect at all on shareholder returns. There are three previous studies that look directly at the EPS impact and relate that to market returns. Andrade (1999) shows that the increase in EPS is positively correlated with both the announcement period return and the long term performance. He also claims that pooling accounting, which usually gives a higher reported EPS, can increase shareholder returns. Harding and Yale (2002) claim that dilutive transactions perform better than accretive as the EPS dilution brings discipline to the management. Rau and Vermaelen (1998) do not find any significant results when testing for EPS dilution. Panel A in Table V summarises the relevant studies on EPS accretion/dilution.

There are a lot of studies done on pooling versus purchase accounting. These studies are important as the choice of accounting affects the reported EPS. The reported EPS will usually be higher when using the pooling accounting method, but the accounting method has no impact on cash flows. Thus, it is interesting to see why managers choose pooling and how the market reacts to the choice of accounting. There are studies done on the motivation to choose pooling over purchase accounting, the costs of pooling accounting and the market's preference of accounting method. According to the previous research, the view of managers

seems to be that pooling is preferable as the market capitalises any increase in EPS directly, without questioning it. This is supported by the study of Hopkins et al. (2000), who show that buy side analysts value companies using pooling transactions higher. The previous research also shows that managers are willing to incur direct and indirect costs in form of higher premiums to be able to use pooling. The market, however, does not seem to react more positively to pooling accounting. There is weak evidence that goodwill amortisation decreases the equity value for some companies, but most studies seem to agree on (except Andrade (1999)) that pooling cannot increase shareholder returns. The pooling versus purchase studies are summarised in Panel B of Table V.

Table V

Summary of previous research

The table summarises the previous research that is relevant to this study. Panel A describes the EPS accretion/dilution studies that are closest to my study and Panel B summarises all the relevant accounting studies.

Panel A: EPS accretion/dilution studies

Author	Year	Relevant finding	EPS accretion impact on returns
Rau and Vermaelen	1998	EPS impact does not affect long term performance.	0
Andrade	1999	EPS accretion has positive impact on announcement and long-term abnormal share price performance.	+
Harding and Yale	2002	EPS dilutive transactions do better than accretive due to discipline.	-

Panel B: Accounting studies

Author	Year	Short description
Managers' view on pooling		
Lys and Vincent	1995	AT&T pays \$50-\$500 million extra to qualify for pooling, shareholder wealth decreases \$6.5 billion.
Aboody, Kasznik and Williams	2000	The choice of pooling is influenced by the M/B-ratio i.e. underlying goodwill.
Nathan	1988	Acquirers pool when it maximises net profit.
Robinson and Shane	1990	Pooling transactions pay higher premium.
Ayers, Lefanowicz and Robinson	2002	Pooling transactions pay higher premium.
Market's view on pooling		
Hong, Kaplan and Mandelker	1978	Market reaction for purchase transactions positive and zero for pooling.
Davis	1990	Market reaction for purchase transactions positive and zero for pooling.
Hopkins, Houston and Peters	2000	Stock analysts are fooled by choice of accounting. They value companies using pooling transactions higher.
Jennings, Robinson, Thompson and Duvall	1996	Goodwill has strong positive association with equity. Goodwill amortisation decreases value of equity
Vincent	1997	Pooling firms enjoy a premium on valuation over purchase firms
Lindenberg and Ross	1999	Pooling does not result in higher valuation for acquirers

3 HYPOTHESES

The idea of this study is to get to the bottom of the EPS accretion or dilution resulting from a business combination and to look at how it affects shareholder returns. There are three sources of EPS accretion or dilution in a business combination. The three sources are the choice of accounting, choice of financing and different P/E-ratios of the acquirer and target (Andrade (1999)). The impact a transaction has on the acquirer EPS can be quite dramatic. However, EPS accretion due to differential P/E-ratios or choice of accounting does not affect cash flows at all and thus it should have no effect on valuation. Still, the press, managers and investment bankers put a lot of emphasis on earnings accretion when evaluation mergers and acquisitions. Lys and Vincent (1995) report how managers think that investors will capitalise the artificially increased EPS with the acquirers P/E-ratio. Thus, if the P/E-ratio is 20 and the acquirer EPS will increase from €1.00 to €1.20, the share price should increase by €4.00. This logic is puzzling in terms of financial theory.

Andrade (1999) suggests two different views of looking at EPS accretion: the naïve practitioners' view and the efficient markets view. The naïve practitioners' view suggests that investors only look at the EPS figures and are perfectly fooled by the accounting accretion that results from the merger. The efficient markets view predicts that the market sees through EPS accretion and adjusts the post-acquisition price and P/E-ratio. I will use these definitions when formulating the hypotheses of the study.

The first issue of this study is to look at the relationship of acquirer and target P/E-ratios. The naïve practitioners' view and the advice that investment banks give is that a company should not by another company with a higher P/E-ratio as it results in EPS dilution. In their study of conglomerate and predatory acquisitions of the 1960s Barber et al. (1995) find evidence that especially friendly acquisitions were concentrated along targets with low P/E-ratios. This is something that should be found in the sample used in this study as well, assuming the naïve practitioners' view is dominant. It should also be observed that the acquirer P/E-ratios are distributed around a higher mean than the target P/E-ratios. When dividing the acquirer P/E-ratio with the target P/E-ratio, it should be observed that this ratio is distributed above one, pre and post the acquisition premium.

If the naïve practitioners' view holds, an artificial increase in acquirer EPS should be observed in the acquirer's share price. Thus, if a transaction is accretive for the acquirer, the announcement period cumulative abnormal return should be positive. If the acquirer EPS decreases due to the acquisition, the announcement period return should be negative. Thus, the acquirer cumulative abnormal return on announcement is positively related to EPS accretion. This view is supported by the findings of Andrade (1999). However, Rau and Vermaelen (1998) did not find any relationship and Harding and Yale (2002) claim that the relationship is negative. Accounting studies such as Lys and Vincent (1995), Aboody et al. (2001) or Hopkins et al. (2000) all document the existence of a strong practitioners' view. Other accounting studies such as Hong (1978) or Davis (1990) try to find out whether pooling can improve acquirer returns and conclude that artificial EPS accretion should not matter. Lindenberg and Ross (1999) find that pooling, which reports a higher EPS, results in a negative stock market response.

The cumulative abnormal return for acquirer shareholders is in itself interesting. The abnormal returns to acquirer shareholders should logically be positive or at least zero, so that the shareholders of the acquiring company do not suffer when acquiring another company. There has been much debate about the meaningfulness and value creation of mergers and acquisitions, especially to acquiring shareholders. Berkovitch and Narayanan (1993) find that from their sample 76 percent of transactions achieved positive total returns, but this was mostly attributable to the target positive returns. Jensen and Ruback (1983) review many studies of corporate takeovers and report that the bidding firms' shareholders do not suffer losses. Schwert (1996) finds that the average abnormal returns to bidders are not significantly different from zero. The predominant view is that the acquirer should not be worse or better off i.e. the hypothesis is that the average abnormal return for acquirer shareholders is zero.

To summarise, the hypotheses of the study are:

H1: Firms acquire other firms with lower P/E-ratios and thus the P/E-ratio relative is distributed above one.

H2: Cumulative abnormal returns for acquirer shareholders are positive or zero

H3: Cumulative abnormal returns are positively related to the P/E-ratio relative of the target and acquirer.

4 DATA AND METHODOLOGY

4.1 Data

The initial data for the sample is retrieved from the Securities Data Corporation's (SDC) mergers and acquisitions database. There are several restrictions made to the sample in order to make the study feasible.

The study is restricted to include only transactions where both the target and the acquirer are publicly listed companies and are based and listed in the US. This limitation is set because of better comparability of the sample transactions. As the study is significantly depending on earnings and merger legislation and there are different accounting standards and tax treatments in different countries, including transactions from more than one country would create problems.

The sample is also restricted to transactions that are announced between 1.1.1990 – 31.12.2000. The data includes transactions where the transaction value is more than US$100 million. This is to ensure that the size of the transaction is meaningful to be able to draw any conclusions. It also insures that the companies involved in the transaction are large enough so that they are followed by the investor community and that there are no problems with poor liquidity causing distortions in price.

The sample includes only completed transactions. The sample is also restricted to transactions where more than 80% of the target is acquired. To be able to draw any conclusions of the acquirer returns and EPS accretion, the EPS has to actually change and thus the transaction has to be large enough and the acquirer has to consolidate the target. This limitation is to ensure that the resulting change in EPS will be sufficient. The final sample includes only transactions where the acquirer owns over 90% of the target after the transaction, most targets being fully owned after the transaction.

After these restrictions made, the sample size retrieved from SDC is 2,029 transactions. The data retrieved from SDC are the transactions, their announcement and completion dates,

acquirer and target Standard Industry classification (SIC) and Committee of Uniform Securities Identification Procedures (CUSIP) codes, acquisition payment method, percent acquired, pooling flag, price paid and the acquirer and target industry sector codes.

The idea in this study is to use EPS estimates, as if you want to evaluate the impact on acquirer EPS, the pre-merger EPS is irrelevant and the only thing that matters is future EPS. This is because the market is extensively focused on future EPS and the merger announcements will usually reflect the benefits to future earnings and EPS. Analysts also often adjust the EPS not to include any extraordinary items, which might distort the results. However, there are many studies showing that analysts are overoptimistic (see e.g. Abarbanell (1991) or Brown et al. (1985)). It leads to the EPS estimates being upward biased but consensus EPS estimates are widely used for valuation purposes and they are the best way to study market expectations of future EPS accretion or dilution.

The database retrieved from SDC is used as a basis of the data for the transactions. With the CUSIP codes and company names retrieved from SDC the data for each company in the transaction sample is retrieved from Datastream, where available.

The EPS estimates in this study are retrieved from Datastream and they are Institutional Brokers Estimate System (IBES) consensus estimates (F1MN, F2MN Datastream codes). Datastream is also used to retrieve the share prices, return indexes, market values of companies involved in the transactions and the acquirer M/B-ratio (P, RI, MV and MTBV Datastream codes). The sample size shrinks in this stage as some of the companies that are in the initial SDC sample cannot be found in Datastream either by name or CUSIP code (approximately 25 percent of companies in the initial sample). It also happened that even though the company could be found in Datastream, Datastream could not find any historical data with that company's code. The number of transactions where data could be found for both the acquirer and target is 997.

Another issue that decreases the sample size is the fact that all companies included in the initial sample are not included in the IBES consensus EPS estimate database. After these limitations the resulting sample is 519 transactions.

To be able to find any meaningful results the transaction has to be such that the target is not tiny in proportion to the acquirer. Deals that are very small to the acquirer do not influence the earnings of the acquirer i.e. do not dilute or accrete acquirer EPS. Thus, one further restriction set to the sample is that the target market value post the announcement has to be at least 10% of the acquirer's market value. It reduces the sample to a number of 323 transactions. The sample is further reduced by excluding all negative P/E-ratios and all P/E-ratios that are above 150. Furthermore, the study uses a set of control variables that are described in the next section and there is not data for some of the control variables for all transactions.

Table VI

Description of sample

This table illustrates the initial sample size and each stage when the sample size decreased and why it decreased. The initial sample is 2,029 transactions and after limitations set by the study and the availability of data the final sample size decreases to 274 transactions.

Sample stage	Restrictions to data	N
Initial sample	• Initial sample after restrictions made in SDC search: - US target and US acquirer - Deal announced 1.1.1990-31.12.2000 - Completed transactions - Public target and public acquirer - Over 80% acquired - Deal size over $100 million	2029
Company search	• Both target and acquirer could be identified from Datastream using CUSIP codes and names retrieved from SDC	997
Data availability	• IBES consensus EPS forecasts available for both the acquirer and target at announcement	519
	• The target market value post announcement is at least 10% of the acquirer market value	323
Final sample	• The acquirer and target P/E-ratio one day prior announcement (t = -1) is less than 150 and positive	274

The number of transactions reduces quite dramatically when restrictions to the data are applied. The restrictions are, however, relevant because it is important to focus on transactions where the EPS accretion or dilution is likely to be an issue. The target has to be large in proportion to the acquirer so that it would have any effect at all on the acquirer's EPS.

Also, the sample decreases when using EPS estimates because estimates are not available for all, especially smaller companies. Using EPS estimates is important as EPS estimates are widely available and used in the investor community and any impact on EPS are very likely to be reflected on future EPS. The resulting sample is large enough, but it is important to remember the limitations of the data when drawing conclusions from the study as the results apply only to large transactions. The relationships in smaller transactions can be quite different, as there are possibly more issues of asymmetric information and problems with liquidity.

There are other possible biases that can affect the results and have to be considered. One bias is also that the most dilutive transactions might not be done at all as practitioners do not prefer them. This presents the problem that the transactions in the sample are transactions where dilution is not a big problem or if managers are willing to make the dilutive transaction, the benefits are so great that they are ready to risk it. Thus, other variables affecting acquirer returns might be more positive in the group of dilutive transactions than in the group of accretive transactions. Another problem is that when limiting the P/E-ratios to positive and below 150, it creates a selection bias as companies that have negative earnings or very low earnings are removed (very low EPS → very high P/E-ratio). If the target is currently making losses and will be making losses in the near future, it will dilute acquirer earnings. However, negative or too high P/E-ratios are impossible to handle and the bias is mitigated by using EPS estimates for the announcement and following year. This selection bias might not even be a problem as the purpose of the study is to study the EPS accretion resulting from differential P/E-ratios and if the target is loss making it creates unwanted noise to the results.

4.2 Variables

4.2.1 Studied variables

The study is about P/E-ratios and the importance of accretion or dilution. In an acquisition, the important fact that the investment community might focus on is the impact on future EPS, not the reported previous EPS. That is why EPS estimates, instead of actual reported EPS should be used in the study.

AQRPE1$_t$ = The P/E-ratio of the acquiring company calculated as the share price in day t divided by the IBES consensus EPS estimate (Datastream IBES data series code = F1NM) for the fiscal year of the announcement in day t. All negative P/E-ratios and P/E-ratios above 150 are excluded.

TARPE1$_t$ = The P/E-ratio of the target company calculated as the share price in day t divided by the IBES consensus EPS estimate (Datastream IBES data series code = F1NM) for the fiscal year of the announcement in day t. All negative P/E-ratios and P/E-ratios above 150 are excluded.

The fiscal year estimates for the year of the announcement usually include all the information revealed in the quarterly statements. If the announcement of a transaction is in the end of the fiscal year, the EPS estimate can already include a substantial amount of unusual accounting items, e.g. extraordinary items or asset write-downs, which are not relevant for the assessment of future EPS accretion or dilution. The P/E-ratio –variables using next fiscal year EPS estimates also have to be used in the research as these variables do not usually include extraordinary items or other problems. They are also widely available and investors are likely to assess the impact of a merger on the following year's EPS as well. So, if an acquisition is EPS accretive this year but is going to be EPS dilutive next year, investors might put more weight on next year's EPS dilution. This is an issue especially when the transaction occurs late in the fiscal year.

AQRPE2$_t$ = The P/E-ratio of the acquiring company calculated as the share price in day t divided by the IBES consensus EPS estimate (Datastream IBES data series code = F2NM) for the next fiscal year in day t. All negative P/E-ratios and P/E-ratios above 150 are excluded.

TARPE2 = The P/E-ratio of the target company calculated as the share price in day t divided by the IBES consensus EPS estimate (Datastream IBES data series code = F2NM) for the next fiscal year in day t. All negative P/E-ratios and P/E-ratios above 150 are excluded.

PERELA1$_t$ = *AQRPE1$_t$ / TARPE1$_t$*. This ratio is the P/E-ratio of the acquiring company at day t, divided by the P/E-ratio of the target company at day t. If this ratio is close to 1

it means that the acquirer is buying a company with roughly the same P/E-ratio. If this figure is above one it means that the acquirer is buying a company with a lower P/E-ratio and is thus experiencing EPS accretion. If the ratio is below 1 it means that the P/E-ratio of the acquirer is lower than the P/E-ratio of the target. As described in chapter 2, to buy companies with a higher P/E-ratio so that it dilutes earnings is against advice from many investment bankers and it seems that it is against common managerial wisdom.

PERELA2$_t$ = $AQRPE2_t$ / $TARPE2_t$.

TARPE1paid = The P/E-ratio of the target company calculated using IBES consensus EPS estimate for the fiscal year of the announcement, but as price, using the price offered to target shareholders instead of the current market price.

TARPE2paid = The P/E-ratio of the target company calculated using IBES consensus EPS estimate for the next fiscal year, but as price, using the price offered to target shareholders instead of the current market price.

PERELA1paid = $AQRPE1_{-1}$ / *TARPE1paid.* The *PERELA1paid-variable* is the P/E-ratio relative after the premium and is thus very important. This variable is the one that actually determines the EPS accretion or dilution. The pre-premium PERELA-variable does not take into account the premium and it is also interesting as if only the *PERELA1paid* is significant, the influence on returns can come from the premium and not the EPS impact, but the variable post premium is the actual EPS impact variable.

PERELA2paid = $AQRPE2_{-1}$ / *TARPE2paid*

4.2.2 Control variables

It is important to control for variables that can affect EPS accretion/dilution or have been found to affect acquirer shareholder returns in past studies. Control variables used in this study are the acquirer market-to-book (M/B) –ratio, size, purchase vs. pooling accounting, premium paid and method of payment. They are defined below:

Acquirer M/B-ratio = Market value of equity divided by the book value of equity (M/B-ratio). Lang et al. (1989) and Servaes (1991) both find that the shareholders of the acquiring firms with high Tobin's q earn significantly more than the shareholders of the acquiring firms with low Tobin's q.[6] Rau and Vermaelen (1998) find that the poor post-acquisition performance of acquiring firms is mainly caused by low book-to-market ("glamour") –acquirers.

SIZE%

SIZE% is the market value of the target divided by the market value of the acquirer. Servaes (1991) finds that the relative size of the acquirer and target affects total returns but does not affect acquirer returns, at least statistically significantly. However, the relative size of the target and acquirer should be controlled in the study because it affects the EPS impact. If the market value of the target is small, the deal will affect the acquirer's accounting figures less.

POOLING

Pooling is a dummy variable that gets the value of one if the transaction is accounted for as pooling and a value of zero if the transaction is accounted for as purchase. There are several studies described in Chapter 2 that look at pooling versus purchase accounting. The previous research suggests that the acquirer returns should not differ if pooling accounting is used, compared to purchase accounting.

PREMIUM

Premium is the premium offered over the market value of the target one day prior to the announcement of the offer. Andrade (1999) includes premium as a control variable as he believes it is a measure that correlates with over-payment and thus returns. Premium should theoretically be the amount that the company can add value by synergies or value added by better management. This means that a premium in itself is not a signal of over-paying, but any amount paid over possible synergies is overpaying. Thus, if investors do not believe that the acquirer can create as much value from synergies as the value of the premium, the acquirer stock price will decrease.

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[6] Tobin's q = market value of assets / estimated replacement cost of assets
Tobin's q differs from the market-to-book –ratio as it includes total assets, i.e. both debt and equity, and the denominator is not at book values as in M/B-ratio but at replacement values.

%STOCK

%Stock is, by using Andrade's (1999) definition, the percentage of stock that is used in the payment of the transaction. The method of payment is important for two reasons. First, it has been noted important in previous studies. Travlos (1987) and Franks et al. (1991) find that the method of payment significantly affects announcement period returns. They attribute the bigger abnormal returns of stock acquisitions to signalling effects of stock versus cash deals. Loughran and Vijh (1997) study the post-acquisition performance and find that it is related to the form of payment. They find that stock mergers earn significantly negative excess returns of –25 percent while cash deals earn significantly positive returns of 62 percent. Andrade (1999) uses the same %Stock variable and finds that it significantly affects shareholder returns both at announcement and in the long run. Second, earnings dilution is different in stock versus cash deals. This issue is discussed in Section 2.2.

ALLSTOCK

Allstock-variable is a dummy variable that takes the value one if the deal is 100 percent financed by stock and a value of zero otherwise.

INDUSTRY

Industry is a dummy variable that gets the value of one if the acquirer and target are in the same industry and gets the value of zero if they are classified as being in different industries. There are a number of articles that try to find out if the strategic fit affects merger performance, as it is widely believed that conglomerate mergers are more likely to fail (see Jensen (1986)). Agrawal et al. (1992) find that conglomerate mergers perform better, whereas Fuller et al. (2002) do not report any statistical differences in conglomerate or related acquisitions.

4.3 Methodology

4.3.1 Acquirer and target P/E-ratios

The first issue that this study will address is that do companies in fact follow the naïve practitioners' rules? Investment bankers give advice to companies that you should never buy another company with a higher P/E-ratio as this will dilute future EPS. If companies follow these rules, it should be obvious in the sample that the average P/E-ratio for the target firms is lower than the average P/E-ratio of the acquirer. This calculation is a simple arithmetic average and it can be tested with a student's t-test. The means are taken from the same transactions so they are assumed to be dependent and thus the difference of means has to be tested with a paired samples t-test. This test should be done on the mean P/E-ratios both pre- and post-offer. P/E-ratios are not normally distributed as the minimum is zero and there is basically no maximum (although they are limited to 150 in this study). Most of the P/E-ratios, however, are probably between 10 and 25. The answer is to study the logarithm of the P/E-ratios.

The second interesting issue is to divide the acquirer's P/E-ratio with the target's P/E-ratio and look at this variable, PERELA. PERELA is interesting in a descriptive way. The perfect market view suggests that this variable is randomly distributed around 1. The naïve practitioner's view shows that this variable is distributed above 1, and there should be none or only a few observations below 1. It is also interesting to see how PERELA evolves in the longer term.

In addition to studying the P/E-ratio relatives we can look at the relationship of the acquirer and target P/E-ratios directly using a simple OLS-regression.

$$ln\ AQRPE1_t = \alpha + \beta \times ln\ TARPE1_t + \varepsilon \qquad (3)$$

4.3.2 Announcement period abnormal returns

Announcement period returns will be calculated using the cumulative abnormal return (CAR) –methodology, common in event studies. In this methodology, an abnormal performance for each day surrounding the merger announcement is determined. In order to be able to determine the abnormal performance, one has to first determine the normal performance for each security. After the normal performance, which a security should experience given that there are no firm specific events, has been determined, the abnormal performance is calculated. The abnormal performance for each security is the deviation from the normal performance i.e. the difference between the actual return and the expected return for the day. Abnormal performance (AR) is thus defined as:

$$AR_{it} = R_{it} - E(R_{it}), \tag{4}$$

where

AR_{it} = the abnormal performance of security i on day t

R_{it} = the measured performance of security i on day t

$E(R_{it})$ = the expected normal return of security i on day t

There are three common methods for calculating the normal return of a stock – the constant-mean-return model, the market model and the market adjusted return model. The market adjusted return model is the simplest one. The difference between a market model and the constant-mean-return model is that the constant-mean-return model uses the mean daily return as the normal return while the market model uses the daily return and the sensitivity to the daily market return. The market adjusted return model assumes that the normal return for each security is the market return and any deviation from the market return is abnormal return.[7]

In the market model and the constant-mean-return model the normal return is estimated from a determined time period before the merger announcement. This study uses the market model, even though it is shown that the constant-mean-return model yields similar results as more

[7] There are several papers and books describing the methodologies of event studies and discussing the calculation of abnormal returns. See e.g. Brown and Warner (1980; 1985) or Campbell et al. (1997, pp. 149-166).

complex models (see Brown and Warner (1985)). For reference the CAR calculated with constant-mean-return model is also shown graphically.

The market model is defined as:

$$R_{it} = \alpha_i + \beta_i \times R_{Mt} + \varepsilon_{it}, \tag{5}$$

where

R_{it} = the return of security i on day t

α_i = the return that each security i has with a zero market return

β_i, = security i's sensitivity to market return

R_{Mt} = the market return

ε_{it} = the abnormal performance of security i on day t

The market model is used to estimate the variables α_i and β_i using a time period before the announcement. These security specific sensitivities and drifts are then used to calculate the abnormal return in the event window and using the formula:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i \times R_{Mt}), \tag{6}$$

where

AR_{it} = the abnormal return of security i on day t

R_{it} = the return of security i on day t

α_i = the return that each security i has with a zero market return

β_i = security i's sensitivity to market return

R_{Mt} = the market return

Equation 6 is thus the same as Equation 4. The expected return is calculated using each security's drift and sensitivity to market return. The estimation window in this study, when the variables α_i and β_i are calculated using the market model, is a time period of 200 trading

days, ending 10 days prior to the merger announcement (see time line in Figure 1).[8] As a proxy for market return the S&P500 equity index is used.

One of the assumptions of the market model is that the returns are normally distributed. Thus, R_m and R_i are calculated as logarithmic returns:

$$R_t = log\, RI_t - log\, RI_{t-1}, \tag{7}$$

where

RI = the return index from Datastream database[9]

Using logarithmic returns also eliminates one problem of bias. Barber and Lyon (1997) show that cumulative abnormal returns using percentage returns distorts the real returns to shareholders because it ignores compounding.

The abnormal returns AR_{it}, are calculated for each day of the event window using Equation 6. The event window used in this study is a short 5 trading day event window starting 2 days before the announcement of the transaction (-2 to +2). The time-line of the study is presented in Figure 1.

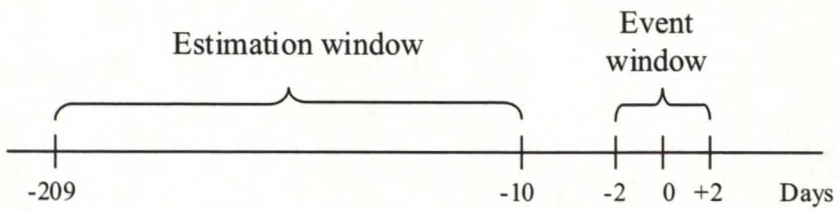

Figure 1. Time line of event study. The figure shows the time line used in the event study. The estimation window is the time period used to estimate the parameters in the market model. The event window is the time period that is used to calculate the cumulative abnormal returns surrounding the event. Day 0 is the announcement date.

The daily abnormal returns AR_{it} calculated for the event window are aggregated for each day to get the daily average abnormal return (AAR). AAR is defined as:

[8] The announcement date (as received from SDC) is defined as the date zero. If the announcement date is a day when there is no trading, the day following the announcement is used as day zero.
[9] The Datastream Return index includes any possible dividends and is thus the right measure of the holding period return.

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it}\,, \tag{8}$$

where

AR_{it} = security i's abnormal return in day t.

N = number of firms in the sample

These average abnormal returns *AAR*, for each day in the event window, are then cumulated to get the cumulative average abnormal return (CAAR) for the whole sample. The CAAR is interesting in order to see the abnormal return for the whole sample and relate that to previous research and the other results in this study. CAAR is the cumulative abnormal return for the whole sample and the cumulative abnormal return (CAR) for each security is calculated similarly, aggregating the abnormal returns AR_{it}, for the event window. CAR for individual securities is the sum of the daily abnormal returns for that security during the event window:

$$CAR_i = \sum_{t=-2}^{+2} AR_{it} \tag{9}$$

Next, the statistical significance of the abnormal return has to be tested. One problem in testing of the significance of the abnormal returns is that it is usually assumed that the abnormal returns are not correlated. One way to be sure that the abnormal returns are not correlated is that the event periods are not overlapping in the sample. The sample used in this study has overlapping event periods. The problem is that if the announcements are somehow related with each other, that might affect the abnormal returns. Andrade et al. (2001) report that mergers come in waves and they usually cluster by industry. An industry-specific shock, e.g. deregulation can trigger a merger wave and thus the fact that these mergers are related can affect abnormal performances.

Collins and Dent (1984) use weekly returns and find that if the positive correlation in return data is ignored, the effect on test statistics for larger samples is dramatic. For example, they report data that if the cross-correlation in returns is 0.2 and the sample size is 200, the estimate of the sample standard deviation is roughly 16 percent of the true value. Bernard

(1987) discusses the problem of cross-sectional correlation in event studies. He reports that cross-sectional correlation increases as the time interval increases. When using daily returns and when the sample is well diversified across industries correlation is likely to be small. Bernard (1987) also reports that the typical procedures of handling cross-sectional correlation in abnormal returns is sufficient.

There are two t-test statistics that can be used for the statistical significance of the abnormal returns. The difference of the test statistics is in the assumption of the variances of abnormal returns and the degree of cross-sectional dependence in returns (see Campbell et al. (1997, pp. 162). As there is a possibility of problems arising from cross-sectional dependence the test statistic that is not sensitive for dependence in abnormal returns is chosen. The variance is based on the time series of average abnormal returns and it is calculated from the estimation period (200 day period ending 10 days prior to announcement). The daily average abnormal returns and the cumulative average abnormal returns for the event window are both tested for the statistical significance of the deviation from zero. The t-test statistic for the significance of AAR_t, assuming that the abnormal returns are normal and independent is defined as:

$$t_{AAR} = \frac{AAR_t}{\left[\frac{1}{200-1}\sum_{t=-209}^{-10}\left(AAR_t - \overline{AAR}\right)^2\right]^{\frac{1}{2}}}, \tag{10}$$

where

AAR_t = the average abnormal return in day t

$\overline{AAR}$ = the mean of the average abnormal returns in the estimation period

The test statistic for CAAR is calculated with the same assumptions as the statistic for the AAR. The event period used in this study is five days (-2 to +2). The t-test statistic for the significance of CAAR is thus defined as:

$$t_{CAAR} = \frac{\sum_{t=-2}^{+2} AAR_t}{\sqrt{5}\left[\frac{1}{200-1}\sum_{t=-209}^{-10}\left(AAR_t - \overline{AAR}\right)^2\right]^{\frac{1}{2}}}, \tag{11}$$

where the variables are defined as above. Both the test statistics have 200-1 degrees of freedom as the variance is calculated from the estimation period of 200 days.

4.3.3 Analysis of CARs

I will use two methods in attempting to assess how the PERELA-variable affects CARs. The first method will be to divide the sample into different sub-samples according to the hypotheses and control variables and then compare the average CARs of these sub-samples. The second method is to use ordinary least squares (OLS) regression analysis to determine which factors influence the announcement period returns.

The first method will be to compare CAARs of sub-samples. The sample will be divided into different sub-samples using the control variables and also dividing the sample to low- and high-PERELA transactions. The difference of the sub-sample CAARs can then be tested with a normal student's t test as the CAARs are normally distributed (Brown and Warner (1985)). The test assumes that the variables are normally distributed and that the abnormal returns are independent. Independence might be an issue, as mergers do tend to cluster.

The dependence of the variables and CARs will be tested with a simple OLS model and a multiple OLS regression model. The simple model is defined as:

$$CAR_i = \alpha + \beta \times VARIABLE_i + \varepsilon_i, \tag{12}$$

where the variable is the either a form of the studied variable PERELA, or one of the control variables (Acquirer M/B-ratio, size, pooling, premium, %stock, allstock dummy and industry dummy). Thus, each variable's dependence on the cumulative abnormal return will be modelled independently.

The multiple OLS regression model is defined as:

$$CAR_i = \alpha + \beta_1 \times PERELA + \sum_{i=2}^{N} \beta_i \times CONTROL_i + \varepsilon_i \tag{13}$$

The model is in a general format as there are many PERELA-variables that are tested and also different control variables are used in several regressions.

If the dependent variable is not continuous but dichotomous, the OLS regression cannot be used. That is why a multinomial logit maximum likelihood regression is also used in this study. The logit model can handle dependent variables that are divided into classes. The multinomial logit model is defined as:

$$ln\left(\frac{P_i}{1-P_i}\right) = \alpha + \sum \beta_i \times variable_i + \varepsilon_i, \quad (14)$$

where P_i is the probability of a predetermined event to occur. The logit model is used to test what affects the probability of companies to use stock, cash or other methods of payment in a transaction.

5 EMPIRICAL RESULTS

5.1 Descriptive statistics

5.1.1 Transaction characteristics

There are 274 transactions in the final sample. The number of transactions each year is shown in Figure 2. The figure also shows the cumulative distribution of the transactions. There are not many transactions in the first five years in the sample. Just over half of the transactions in the sample occur before 1998.

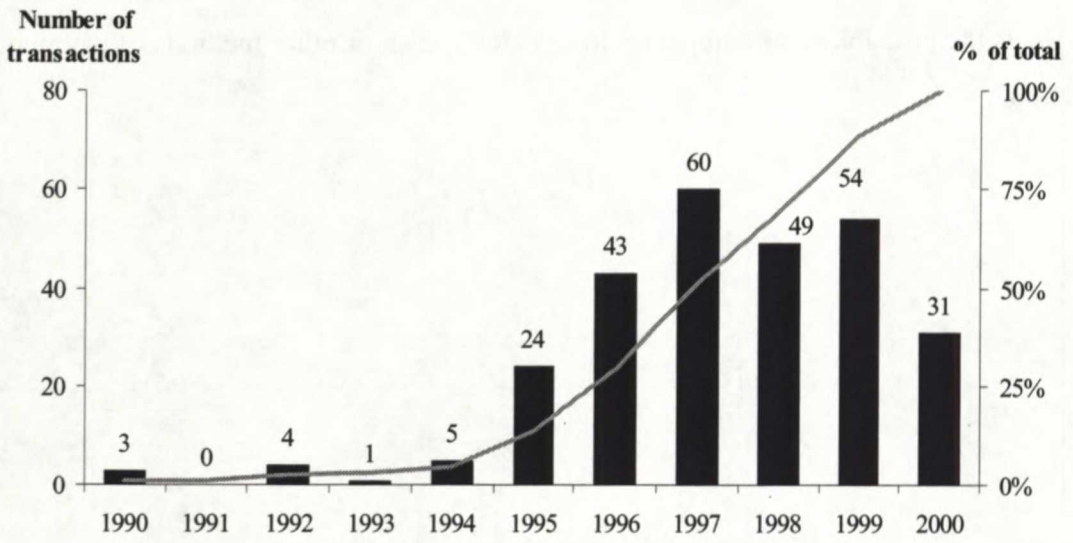

Figure 2. Number of transactions per year. This figure shows the number of transactions included in the sample and the cumulative distribution of the sample.

The sample transactions are quite heavily distributed to the later part of the research period. The first five years make less than five percent of the total sample. The number and volume of mergers and acquisitions did increase substantially during the decade, but the final sample is slightly skewed to the end of the decade. Table VII shows the whole market of mergers and acquisitions in the US (not all transactions included). Mergers and acquisitions have grown extremely rapidly almost the whole decade. The aggregate value of transactions in the end of 90s was more than tenfold compared to the beginning but the number of transactions has not increased just as much.

Table VII

Descriptive statistics on mergers and acquisitions in the US

This table shows the number of deals and US dollar value in billions of mergers and acquisitions in the US. There are two sources of data, the first is Dealogic and the second is Mergerstat. The data from Dealogic includes only deals with a transaction value of more than $100 million, while the Mergerstat data should include all deals.

	Dealogic		Mergerstat
Year	Number of deals	Value of M&As	Value of M&As
1990	N/A	N/A	108
1991	N/A	N/A	71
1992	N/A	N/A	97
1993	N/A	N/A	176
1994	N/A	N/A	227
1995	556	429	356
1996	691	521	495
1997	998	763	657
1998	1,080	1,244	1,192
1999	1,052	1,276	1,427
2000	1,113	1,250	N/A

Figure 3 shows the yearly distribution of the number of transactions in the initial sample. It can be seen that the growth in number of transactions is dramatic but the growth is not as large as the growth shown in Table VII, where the transactions are not as selected in the first place. The final sample in the study is not identically distributed with the initial sample but it represents better the sample described in Table VII. However, as the final sample is skewed to the end of the decade, it is somewhat biased, as the end of the decade was a period of fast growth. Approximately half of the transactions in the initial sample occurred before the year 1997, whereas in the final sample approximately half of the transactions occurred after 1997. The final sample represents quite well the end of the century situation with the transactions distributed almost evenly 1996-2000.

One important factor is how diverse the sample is across industries as the cross-sectional correlation in event returns can be a problem. The problem is likely to be larger if the sample is not well diversified across industries, as mergers tend to cluster by industry (see Andrade et al. (2001). Table VIII shows the number of different acquirer industries that there are in each year and also what is the maximum number of acquirers in the same industry each year. The sample is distributed among many different acquirer industries, but there are also many companies each year that are in the same industry sector. From year 1995 to 2000, when there

are more than just a few transactions, the number of different industries is slightly less than half of the number of acquisitions in that year. The biggest sector in almost all years is acquirers that are classified as bank holding companies. The industry classification is based on the SDC database two-letter industry sector code classification.

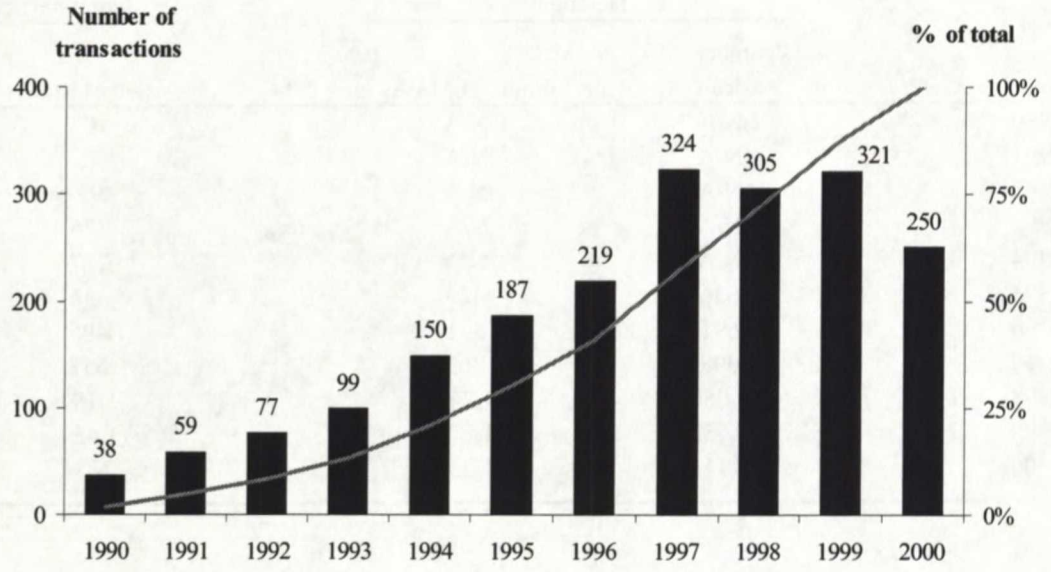

Figure 3. Yearly distribution of transactions in initial sample. This figure shows the yearly distribution of the transaction announcements in the initial sample after the SDC search. The transaction restrictions include: US target and acquirer, transaction value over US$100 million and both parties public.

Table VIII

Number of different industries per year

This table shows the number of total transactions per year, the number of different acquirer industries per year and the maximum number of acquirers in the same industry per year. The industry classification is based on the SDC database two-letter industry sector code classification.

Year	Number of transactions	Number of acquirer industries	Max acquirers in same industry
1990	3	3	1
1991	0	0	0
1992	4	3	2
1993	1	1	1
1994	5	5	1
1995	24	13	7
1996	43	23	11
1997	60	25	14
1998	49	23	6
1999	54	24	12
2000	31	18	7

The sample is quite well diversified in terms of accounting method and acquisition currency. The summary statistics are shown in Table IX. The choice of accounting for transactions can be either pooling or purchase and the choice of accounting affects the reported EPS. Approximately 40 percent of the transactions in this sample are pooling transactions and thus almost 60 percent are purchase transactions.

Table IX

Transaction characteristics

Panel A shows how the transactions in the sample are accounted for. The choices of merger accounting are pooling and purchase. Panel B shows the distribution of acquisition financing in the sample transactions. All stock means that the transaction is stock-for-stock, while all cash means that the transaction is financed 100 percent by cash. Other includes transactions that are financed by a combination of stock and debt or stock, debt and some other financial instrument. The last column >50% stock includes all transactions where stock comprises over half of the acquisition currency. Panel C shows the number of acquisitions where the acquirer and target are in the same industry sector versus the acquisitions where the target and acquirer are in different industries. The classification is made with the two-letter SDC industry code classification.

Panel A: Merger accounting method		
	Number	% of total
Pooling	114	41.6%
Purchase	160	58.4%
Panel B: Acquisition currency		
	Number	% of total
All stock	134	48.9%
All cash	42	15.3%
Other	98	35.8%
Total	274	100.0%
>50% stock	173	63.1%
Panel C: Horizontal acquisitions		
	Number	% of total
Acquirer and target in same industry	168	61.3%
Acquirer and target in different industries	106	38.7%
Total	274	100.0%

As can be seen from Table IX, almost half of the transactions are stock-for-stock transactions. Transactions financed 100 percent by cash are 15 percent of the whole sample, while other payment methods are used in 36 percent of the sample. Other payment methods include both transactions where the transaction is financed by a combination of stock and cash or

transactions where stock, cash and other financial instruments are used. The last row in Panel B of Table IX indicates how many transactions there are in the sample, where the acquisition currency is predominantly stock i.e. where acquirer stock make up over 50 percent of the payment to target shareholders. The number of these transactions is 173, or over 60 percent of the sample. Panel A in Table X shows the distribution of acquisition currency in the initial sample. The proportion of stock-for-stock transactions in the final sample is almost ten percent less than the proportion in the initial sample. The number of all cash transactions is almost equivalent in both samples.

Table X

Acquisition currency in initial sample

This table shows the distribution of acquisition currency in the initial sample after the SDC search. All stock means that the acquisition is a stock-for-stock transaction as all cash means that the whole transaction is paid with cash. Other payment method includes both transactions with a combination of cash and stock or transactions with a combination of cash, stock and other payment methods.

Panel A: Acquisition currency		
	Number	% of total
All stock	1,162	57.3%
All cash	322	15.9%
Other	545	26.9%
Total	2,029	100.0%

Panel B: Horizontal acquisitions		
	Number	% of total
Acquirer and target in same industry	1,253	61.8%
Acquirer and target in different industries	776	38.2%
Total	2,029	100.0%

Panel C in Table IX shows the distribution of acquisitions according to industry sectors. Almost 40 percent of the acquisitions are acquisitions where the target and acquirer are in different industry sectors. The classification is made with a two-letter SDC database industry sector code classification, which seems to follow the Standard Industry Classification (SIC) codes. Andrade and Stafford (1999) discuss the problems associated with the use of industry classification and especially the problems with SIC codes. Panel B of Table X reports the equivalent distribution in the initial sample and the number of acquisitions within the industry is almost identical in the final sample.

5.1.2 Summary statistics of variables

The summary statistics of the variables used in the study and defined in Chapter 4.2 are presented in Panel A of Table XI. Panel B includes the summary statistics of the control variables used. The PERELA and P/E-ratio variables are also discussed in more detail in the next section. The average P/E-ratio for the target one day prior to the announcement ($TARPE1_{-1}$) is 19.7 while the median is lower at 16.8. There are both large and small P/E-ratios, the standard deviation being 13.1, but most of the P/E-ratios seem to fit between 12 and 22. Looking at the target P/E-ratios 10 days earlier ($TARPE1_{-10}$) it can be seen that the stock price of the target companies has increased slightly during the 10 days prior the announcement. All statistics are slightly higher than ten days before. There is one transaction more in the sample one day before but its P/E-ratio is 7.5 so it cannot explain the increase. The increase of target stock prices before the announcement date is reported in several empirical studies. Bradley et al. (1988) report that abnormal returns to target shareholders begin to rise already 20 days before the announcement, and the CAR for the period before the announcement is one percent.

The acquirer P/E-ratio ($AQRPE_{-1}$) does not change before the announcement and the figures are similar for $AQRPE_{-1}$ and $AQRPE_{-10}$. The mean P/E-ratio is 19.4 and the median is lower at 15.6. The surprising matter is that the statistics for the acquirer P/E-ratio are similar to the target P/E-ratio. Investment bankers give advice to clients that they should not buy other companies with higher P/E-ratios. If companies follow this line of reasoning the acquirer P/E-ratios should be higher than the targets'. Also, if companies do acquisitions in order to increase EPS, it should also be observed as higher P/E-ratios for the acquiring companies. Both the acquirer and target P/E-ratios, using the following year EPS estimates ($TARPE2_t$ and $AQRPE2_t$), are similarly distributed, but lower. This is because the calculation does not take into account the fact that the EPS is one year later and should basically be discounted. Another factor is that analysts are overly optimistic about their earnings estimates (see e.g. Abarbanell (1991) or Brown et al. (1985)). The average P/E-ratio with the following year's EPS estimates is 15.6 for targets and 15.7 for the acquirers. For both acquirers and targets, more than half of the P/E-ratios are between 11 and 18, but the acquirers' standard deviation is slightly higher.

Table XI

Summary statistics of variables

This table shows the summary statistics for the variables included in the study. *TARPE1-1* and *TARPE1-10* are the target P/E-ratio one day and ten days prior to the announcement of the merger calculated using EPS estimates for the fiscal year of the announcement. *AQRPE1-1* and *AQRPE1-10* are the acquirer P/E-ratio one day and ten days prior to the announcement of the merger calculated using EPS estimates for the fiscal year of the announcement. *TARPE2-1* and *AQRPE2-1* are the target and acquirer P/E-ratios one day prior to the announcement calculated using EPS estimates for the next fiscal year. The PERELA-variable is the acquirer P/E-ratio divided by the target P/E-ratio. The *PERELA1*-ratios are calculated from the P/E-ratios using EPS estimates for the announcement year, and the *PERELA2*-ratios are calculated using the next fiscal year's EPS estimates. The -10, -1 and +3 figures in the *PERELA1*- or *PERELA2*-ratios indicate the day that the ratio is calculated related to the announcement (ten days prior, one day prior and 3 days after the announcement). The *TARPE1paid*- and *TARPE2paid*-variables are the target P/E-ratio calculated using the price offered to target shareholders and the announcement year's or next year's EPS estimates respectively. The *PERELA1paid*-ratio is defined as *AQRPE1-1* divided by the *TARPE1paid*-ratio and *PERELA2paid* is *AQRPE2-1* divided by the *TARPE2paid* ratio. The *TARMV* and *AQRMV* are the target and acquirer market values prior to the announcement and the *SIZE*-variable is the target market value divided by the acquirer market value. The *Acquirer M/B* –ratio is the acquirer market-to-book –ratio. *Prem%-1* and *Prem%-20* are the premium calculated as the premium paid to target shareholders over the closing share price one day and twenty days prior to the offer. *%STOCK* is the percentage of stock used as acquisition currency of the amount.

Panel A: Variables

	Mean	Median	First quartile	Third quartile	Min	Max	Standard deviation	N
TARPE1-1	19.72	16.81	12.82	21.35	2.90	120.83	13.09	274
TARPE1-10	18.49	15.65	12.30	19.73	2.63	110.50	12.25	273
AQRPE1-1	19.36	15.59	12.39	22.74	1.14	119.44	13.73	274
AQRPE1-10	19.45	15.58	12.34	22.13	1.17	107.89	13.68	274
TARPE2-1	15.60	13.99	11.36	17.53	0.64	60.58	6.99	262
AQRPE2-1	15.73	13.49	10.98	17.76	3.23	76.56	8.88	267
PERELA1-1	1.09	0.97	0.76	1.22	0.14	5.25	0.65	274
PERELA1-10	1.17	1.03	0.82	1.34	0.15	5.33	0.69	273
PERELA1+3	0.92	0.84	0.66	1.01	0.10	4.58	0.54	272

Table XI – *Continued*

Panel A: Variables

	Mean	Median	First quartile	Third quartile	Min	Max	Standard deviation	N
PERELA2-1	1.12	0.97	0.81	1.19	0.20	17.78	1.14	255
PERELA2-10	1.21	1.03	0.86	1.31	0.21	20.54	1.31	255
PERELA2+3	0.95	0.83	0.70	1.03	0.10	17.65	1.10	256
TARPE1paid	24.86	20.96	16.13	27.35	3.99	121.00	15.57	273
TARPE2paid	19.76	18.03	14.35	23.26	3.06	62.12	8.68	262
PERELA1paid	0.86	0.78	0.60	0.95	0.09	4.61	0.52	273
PERELA2paid	0.84	0.79	0.65	0.95	0.10	4.14	0.38	255

Panel B: Control variables

	Mean	Median	First quartile	Third quartile	Min	Max	Standard deviation	N
TARMV	989.6	318.0	168.6	855.6	12.4	17262.6	1953.5	274
AQRMV	3796.7	1440.3	632.3	3227.1	39.5	93650.4	8504.4	274
SIZE	0.36	0.24	0.15	0.41	0.05	2.29	0.34	274
Acquirer M/B	2.24	1.96	1.47	2.71	-32.24	14.96	2.88	250
Prem%-1	0.35	0.24	0.14	0.39	-0.51	18.94	1.15	274
Prem%-20	0.49	0.37	0.23	0.57	-0.52	21.79	1.32	274
%STOCK	61.18	95.64	0.00	100.00	0.00	100.00	44.57	274

Table XII

Variable correlations

This table shows the correlation matrix of the most relevant variables. The sample size in this matrix is 248 transactions. *PERELA1paid* is the acquirer P/E-ratio one day before the announcement divided by the target P/E-ratio post premium. *PERELA1$_{-1}$* is the acquirer P/E-ratio divided by the target P/E-ratio, both one day before the announcement. *SIZE* is the relative size of the acquirer and target market values. Acquirer M/B is the acquirer M/B-ratio one day prior to the announcement. *Prem%-1* is the premium paid to target shareholders over last previous day's closing price. *%STOCK* is the percentage of stock used as payment method and *All stock* is a dummy variable that gets the value of one if the transaction is 100% stock-for-stock and zero otherwise. Pooling is a dummy variable that gets the value of one if the accounting choice is pooling and zero if it is purchase. Industry is a dummy variable that gets the value of one if the acquirer and target are in the same industry sector and a value of zero if the acquirer and target are in different industry sectors.

	PERELA1paid	PERELA1-1	SIZE	Acquirer M/B	Prem%-1	%STOCK	All stock	Pooling	Industry
PERELA1paid	1.000								
PERELA1-1	0.901	1.000							
SIZE	0.086	0.023	1.000						
Acquirer M/B	0.083	0.125	-0.110	1.000					
Prem%-1	-0.241	0.069	-0.196	0.105	1.000				
%STOCK	0.163	0.161	-0.078	0.086	-0.104	1.000			
All stock	0.067	0.076	-0.103	0.136	-0.066	0.853	1.000		
Pooling	0.001	-0.006	-0.036	0.060	-0.120	0.532	0.504	1.000	
Industry	0.028	0.010	0.006	0.114	0.001	0.051	0.000	0.008	1.000

The PERELA-variable is the acquirer P/E-ratio divided by the target P/E-ratio so the descriptive statistics follow the ones of the P/E-ratios. PERELA one day prior to the announcement is lower than the 10 day prior to announcement as the targets' share prices have increased. The sample size for PERELA using the following year's EPS estimates is smaller as some of the sample companies only had EPS estimates for the announcement year. The primary variables of interest are the $PERELA1_{-1}$ and $PERELA2_{-1}$. The mean for $PERELA1_{-1}$ is 1.1 and the median is 1.0. Thus, the variable is distributed around 1. The acquirer P/E-ratio is 25 percent smaller or larger for approximately half of the transactions but the standard deviation for the PERELA is quite large, 0,65. The PERELApaid-variables are post premium. Surprisingly, they are below one. Even the third quartile is slightly below one, meaning that roughly 75 percent of acquirers possibly make dilutive transactions.

The summary statistics of the control variables defined in Chapter 4.2 are described in Panel B of Table XI. Panel B also includes the statistics of market values of the target and the acquirer before the announcement. The acquirer is, on average almost 4 times bigger than the target. Many of the deals are quite small in relation to the acquirer's market value. The average acquirer M/B-ratio is 2.2, the median is 2.0 and the standard deviation is 2.9. The number of observations for the M/B-ratio is smaller as there was not data of the M/B-ratio for all sample companies.

There are two figures in Panel B of Table XI for premium. The $Prem\%_{-1}$ –variable is the premium calculated as the price paid per the closing price of the target one day prior to the announcement and the $Prem\%_{-20}$ is the price paid per the closing price 20 days prior to announcement. The share price of the target company increases usually before the announcement of the offer because of take-over speculations or leakage of information. It can be seen in this sample as well, as the premium calculated one day prior the announcement is substantially lower than the premium 20 days before the announcement. The average premium ($Prem\%_{-1}$) in the sample is 35 percent while the median premium is 24 percent. Most premiums are between 14 and 40 percent.

The last variable in Panel B is the *%STOCK*-variable. The variable is the percentage of stock used as payment method in the sample of transactions. The average is 61 percent but the median is 95. As almost half of the transactions are all stock financed i.e. the value of the *%STOCK*-variable is 100, the distribution is relatively skewed.

The correlation matrix of the most important coefficients is in Table XII. The correlation of the PERELA-variables is over ninety percent, which is very high and also expected as they are almost the same variable. *Pooling* is also very correlated (over 50%) with the *%Stock*- and *Allstock*-variables. This is also expected as one of the criteria of pooling accounting is that the payment is mostly stock. Premium ($Prem\%_{-1}$) is highly negatively correlated with the *PERELA1paid*-variable (-24%). This is logical as the *PERELA1paid*-variable is post premium i.e. it includes the premium paid. The premium is also negatively correlated with *SIZE*. This is in line with the comment of Weston et al. (2001), who say that small transactions are paid off with cash and cash transactions also have higher premiums. Interestingly, the *Pooling*-variable is negatively correlated with the premium paid. Robinson and Shane (1990) and Ayers et al. (2002) find that pooling transaction pay a higher premium. However, this sample includes all financing methods and the pooling transactions are stock financed transactions. Huang and Walkling (1987) find that in cash deals the return for target shareholders is much higher than in stock deals. Thus, the surprising negative relation between pooling transactions and premium can be explained by the fact that pooling transactions include all large stock-for-stock transactions whereas the purchase sub-sample includes the smaller cash financed transactions.

When using multiple regression analysis as one of the methods, there can be problems with multicollinearity. To avoid multicollinearity the most correlated variables are not used in the same regressions. The other variables that are used in the same regressions are not that correlated. Most of the variables are correlated less than ten percent and this should not be a problem. One interesting relationship still remains. The $PERELA1_{-1}$- and *PERELA1paid*-variables are both approximately 16% correlated with the percentage of stock financing used. It means that the larger the acquirer P/E-ratio in relation to the target P/E-ratio the more stock will be used as method of payment.

5.2 P/E-ratios and PERELA

5.2.1 Analysis of P/E-ratios

The P/E-ratios of both target and acquirer seem lognormally distributed. To be able to better draw any conclusions from the P/E-ratios, the TARPE- and AQRPE-variables transformed into logarithmic variables, e.g. observing the natural logarithm of the target P/E-ratio (ln $TARPE1_t$) instead of the actual ratio. Some of the analysis assumes that the variable is normally distributed and the logarithm of the variable fits better that assumption.

The distribution of the acquirer and target P/E-ratios are shown in Figure 4. The highlighted range in the histogram is the range, where the mean lies in. The mean of ln $TARPE1_{-1}$ is 2.85 as the mean for ln $AQRPE1_{-1}$ is 2.81. This result is somewhat surprising, as one would assume, recalling the naïve practitioners' hypothesis, that companies want to increase their EPS by acquiring other companies with lower P/E-ratios. The numbers in this sample suggest that the acquirer and target P/E-ratios are similarly distributed. Although, if a sample large enough is collected the distribution for the target and acquirer P/E-ratios is likely to be similar.

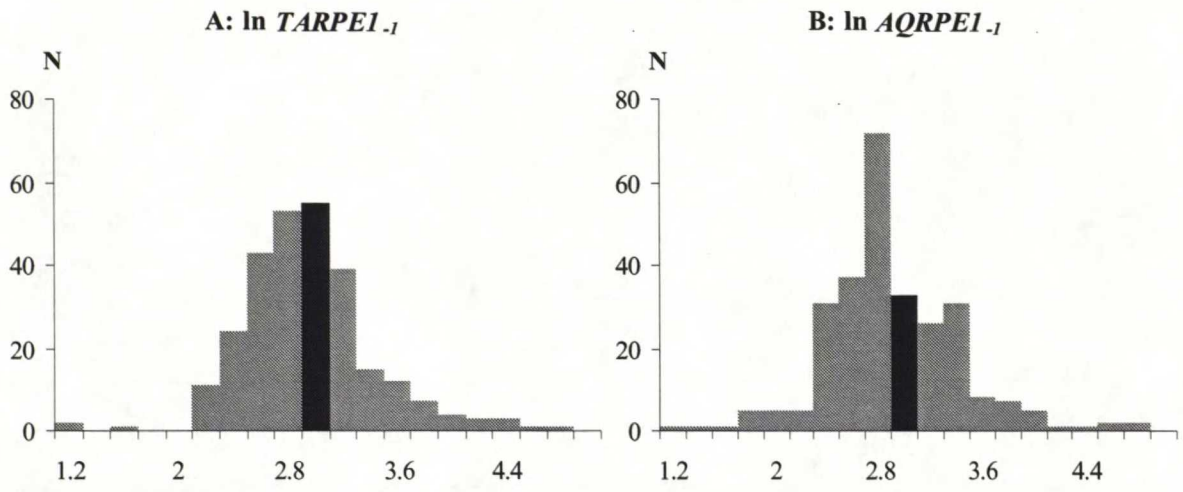

Figure 4: Distribution of acquirer and target P/E-ratios. This figure shows the distribution of the natural logarithm of the target P/E-ratio (A) and the natural logarithm of the acquirer P/E-ratio (B), both calculated one day prior to the announcement of the transaction. The highlighted area is the class, where the mean is. The mean of ln $TARPE_{-1}$ is 2.85 and the mean of ln $AQRPE_{-1}$ is 2.81.

The difference of the mean P/E-ratios for acquirers and targets is tested using a paired samples t-test. The results are shown in Table XIII. The difference is tested using the P/E-ratios ten days prior to the announcement and one day prior to the announcement. This is to ensure that the difference in the means does not change due to the pre-announcement drift in the target share price. The EPS estimate for the announcement year can be depressed or inflated because it can include unusual or extraordinary items not relevant for the ongoing business. That is why the difference of means has to be calculated also using the next year's EPS estimates. The difference of means is also tested using the acquirer P/E-ratio one day prior to the announcement and the target P/E-ratio post-premium.

Table XIII

Paired samples t-test of difference of mean

The means of the acquirer and target P/E-ratios are tested using a paired samples t-test. The tested, paired variables are shown in the first column and their means and standard deviations in the next two. There are four pairs tested. The fourth column shows the difference of the means, which is the value of interest, and the next two columns show the standard error of the difference. The column labeled t-value shows the t-value for the difference of the means and the last column shows the number of observations. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

			Difference of mean				
Variables	Mean	Stdev	Mean	Std deviation	Std error	*t*-value	N
ln TARPE1-1	2.847	0.488	0.038	0.487	0.029	1.276	274
ln AQRPE1-1	2.809	0.532					
ln AQRPE1-1	2.808	0.532	-0.278 ***	0.496	0.030	-9.254	273
ln TARPEpaid	3.085	0.475					
ln TARPE2-1	2.655	0.445	0.005	0.414	0.026	0.211	255
ln AQRPE2-1	2.650	0.449					
ln TARPE1-10	2.783	0.488	-0.037	0.492	0.030	-1.249	273
ln AQRPE1-10	2.820	0.526					

The difference of means is only statistically significant for the acquirer P/E-ratio and the target P/E-ratio after the premium. For the other pairs, the mean P/E-ratios are not statistically different.

The correlation of the P/E-ratios is also quite strong. Figure 5 shows the dependence of natural logarithm of the acquirer and target P/E-ratios. The line shown in Figure 5 is an OLS regression line where the dependent is the ln $AQRPE2_{-1}$ variable and the independent is the ln $TARPE2_{-1}$ variable. The linear relationship is strong, the slope is 0.7 and the intercept is positive. The inclusion of the *Industry*-dummy as an independent variable does not significantly alter the results (not reported).

The strong positive relationship of the acquirer and target P/E-ratios and the slope being close to one mean that acquirers do not deviate from their own P/E-ratios when choosing target companies as can also be seen from the scatter diagram. Barber et al. (1995) find that transactions in the 60s focused on targets with low P/E-ratios. The naïve practitioners' view suggests that acquirers should buy companies with lower P/E-ratios to increase EPS.

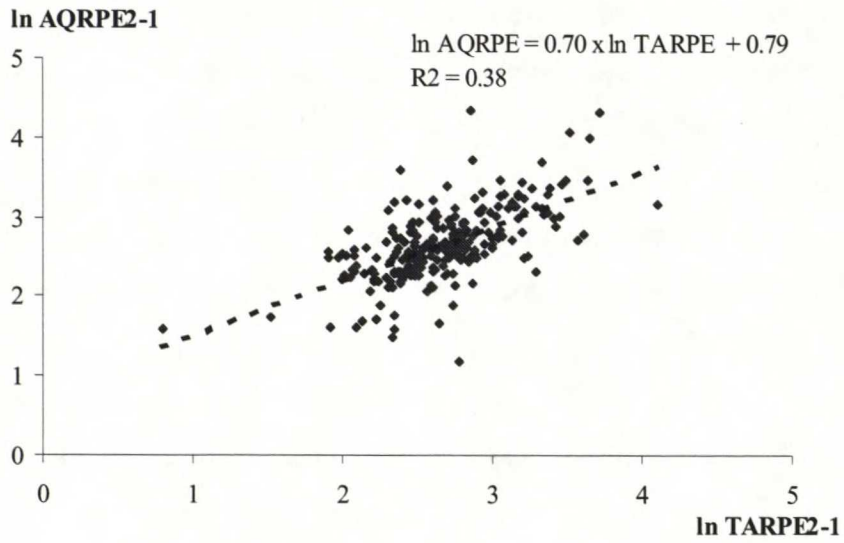

Figure 5. Dependence of acquirer and target P/E-ratios. The y-axis is the natural logarithm of $AQRPE2_{-1}$ and the x-axis is the natural logarithm of $TARPE2_{-1}$. The line shown is the OLS regression line of the variables. Both the slope and intercept are statistically significant at the 1% level (t-values constant=5.3, ln $TARPE2_{-1}$=12.5).

The results in this section are not at all expected and contradict the naïve practitioners' hypothesis. Targets do not have lower P/E-ratios and companies seem to acquire other companies that have similar P/E-ratios, not companies with lower P/E-ratios.

5.2.2 Analysis of PERELA

The PERELA-variable is the acquirer P/E-ratio divided by the target P/E-ratio. As shown in Chapter 2, the relative differences in P/E-ratios affect the impact a transaction has on future EPS of the acquiring company. Practitioners claim that EPS dilution is an important issue and transactions should not be structured so that they dilute EPS. Thus, the naïve practitioners' view suggests that the average PERELA-ratio is distributed well above one, before and after the premium paid to target shareholders.

The distributions of *PERELA1*$_{-1}$ and *PERELA1paid* are shown in Figure 6. The distributions are quite interesting. They show that before the premium, the P/E-relative is distributed around one. The lighter area shows the transactions where PERELA is less than one and the darker area shows the transactions where PERELA is above one i.e. the bootstrap transactions that would be EPS accretive. After the premium, there are not many transactions that have a P/E-relative above one and are EPS accretive. The naïve practitioners' view would suggest completely the opposite. The fact that the PERELA-variable is distributed around one means that, on average, acquirers find targets with similar P/E-ratios. One reason for this could be the difference of conglomerate or horizontal acquisitions. Companies within the same industry can be valued with earnings multiples and this results in all companies in the same sector trading at same P/E-ratios. Thus, if the acquirer and target are in the same sector, they also have similar P/E-ratios. However, that contradicts the practitioners' view as practitioners believe that companies trading with lower P/E-ratios are the attractive ones. Also, if all companies are blindly trading on an earnings multiple, it is beneficial for a company to artificially increase EPS. Furthermore, when dividing the sample to transactions where the target and acquirer are in the same industry sector and transactions where they are in different industry sectors and comparing the means of these sub-samples, there is no statistically significant difference (not reported).

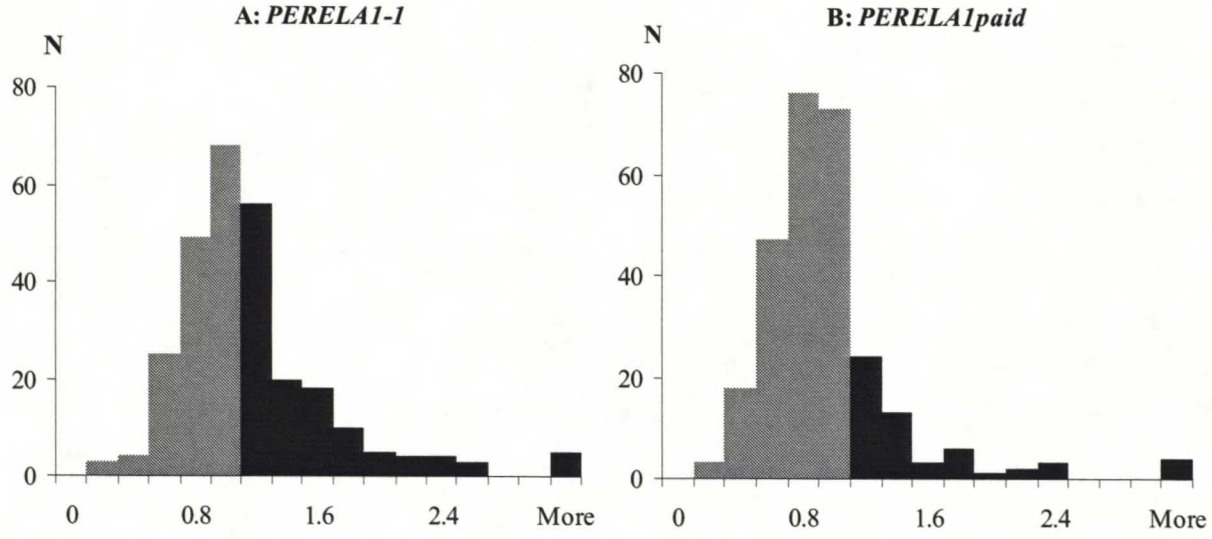

Figure 6. Distribution of PERELA1. This figure shows the distribution of the PERELA1-variable. Figure A shows PERELA1 at time –1 i.e. one day before the announcement. Figure B shows PERELA1 calculated as the P/E-ratio of the acquirer one day before the announcement divided by the P/E-ratio of the target using the price paid i.e. it is the PERELA1 after premium paid to target shareholders. The highlighted area is the area where the variable is above one, i.e. the transactions where the EPS would be accretive.

What is quite surprising is that the PERELA-ratio after the premium is distributed below one. The distributions do not change when controlling with the next year EPS estimates. This means that there are not many transactions that are EPS accretive. Acquirers buy other companies with approximately the same P/E-ratio and then they pay a premium on top of that. If the P/E-ratio were used as a valuation ratio, it would mean that acquirers do not try to find cheap companies but they try to find similarly valued companies and then pay a premium. The average premium in the sample is over $200 million or roughly five percent of the combined market value of the target and acquirer. Thus, acquirers must believe that they can, on average, squeeze cost savings of five percent of the combined market value.

The evolution of the PERELA-variable through time is shown in Figure 7. Part (a) shows the PERELA-variable calculated with the EPS estimate for the announcement year and Part (b) shows the PERELA-variable calculated with the next year EPS estimate. The day zero in the figures is the announcement date.

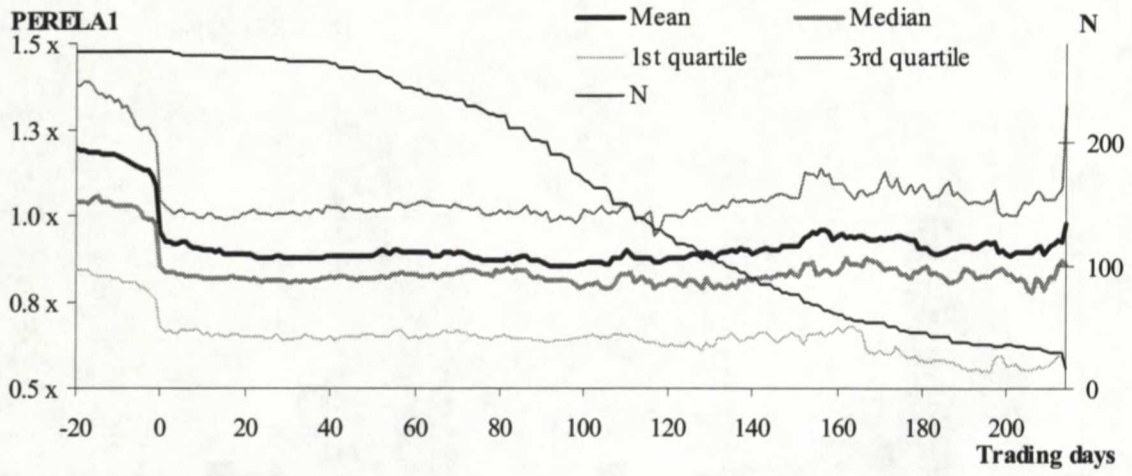

Figure 7 (a)

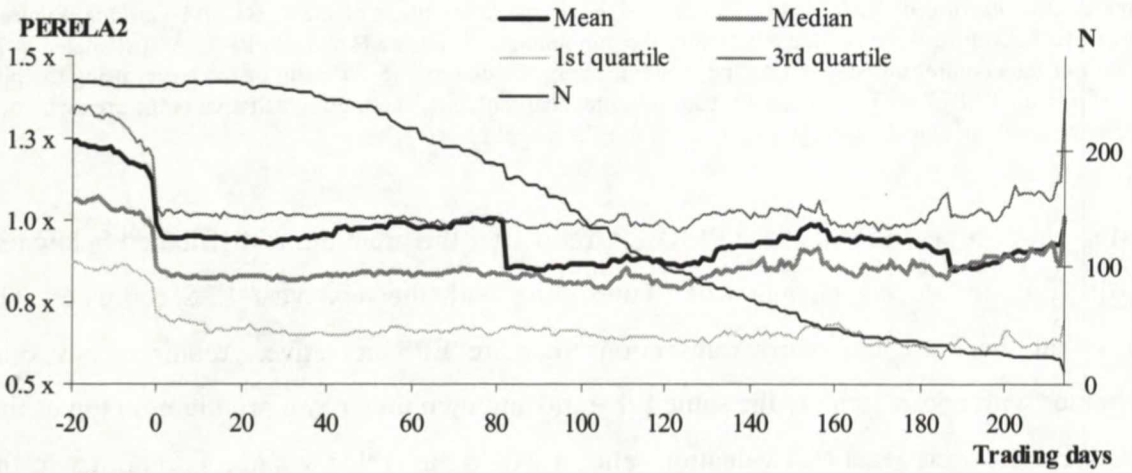

Figure 7 (b). PERELA evolution. Part a of the figure shows the evolution of the *PERELA1*$_t$ –variable through time and part b of the figure shows the evolution of the *PERELA2*$_t$ –variable through time. *PERELA1*$_t$ is the acquirer P/E-ratio divided by the target P/E-ratio using announcement year's estimated earnings per share. *PERELA2*$_t$ is the acquirer P/E-ratio divided by the target P/E-ratio using next year's estimated earnings per share. The figures shows the mean, median and the 1st and 3rd quartiles on the primary axis and the number of observations on the secondary axis. The number of observations decreases quite rapidly as the transactions are completed and the target is delisted. Day 0 is the announcement date.

Figure 7 shows the mean, median and 1st and 3rd quartiles of the PERELA-ratios and their evolution 20 days before the announcement to over 200 days after the announcement. The number of observations, shown on the secondary y-axis, decreases as transactions are completed and targets are delisted.

The mean, median and 1st and 3rd quartiles do not differ much when *PERELA1*$_t$ and *PERELA2*$_t$ is compared. *PERELA2*$_t$ is lower, but this is expected, as the average EPS should increase each year, at least with the speed of inflation. The variance seems slightly lower for

the $PERELA2_t$ before the announcement, but after the announcement even the 3rd quartile seems to be almost below one. It means that the EPS will be diluted for 75 percent of the acquirers in the announcement year and next year. The share price for the acquirer does not seem to decrease further after the announcement. It is difficult to draw any conclusions because the decreasing number of observations distorts the figures. The most important conclusion, though, is the fact that there is not a large difference when using EPS estimates for the year of the transaction or the following year.

5.3 Acquirer announcement period abnormal returns

The announcement period abnormal returns for the acquirer are calculated using the market model as described in Chapter 4. The estimation period for the market model is 200 days ending 10 days before the announcement of the offer. Figure 8 shows the abnormal returns calculated using the parameters from the market model. The CAAR shown in the figure starts from 20 days before the offer but it is not used in any calculations, it is merely descriptive. The figure shows also a CAAR calculated using the daily average abnormal returns from the constant mean return –model. This is just to show that the selection of the model to calculate normal returns yields very similar results and does not affect the conclusion.

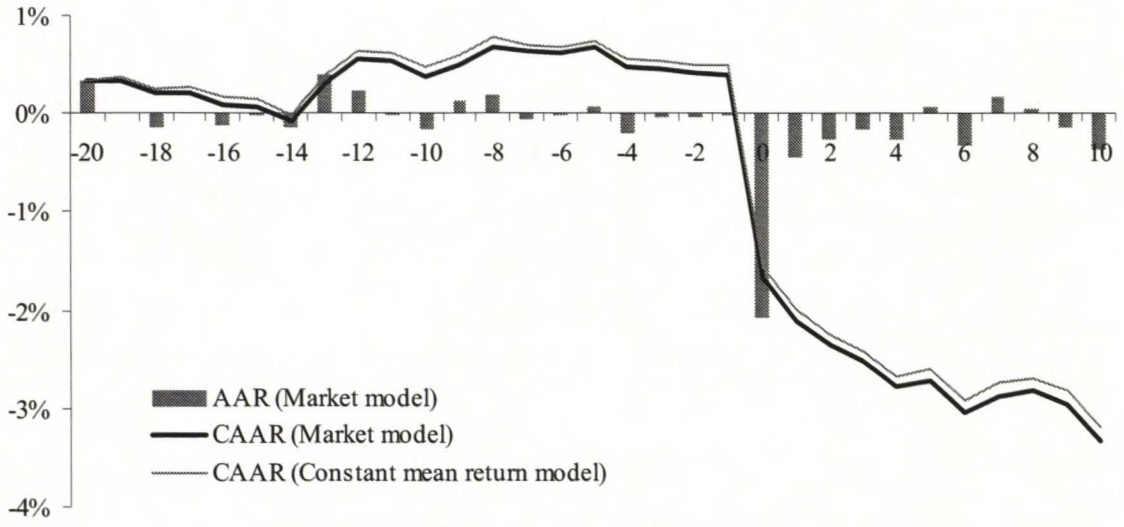

Figure 8. Average abnormal returns. This figure shows the acquirer daily average abnormal returns. The event window used is days from day–2 to day +2. The cumulative average abnormal return is calculated in the graph as to begin from day –20. The CAAR is presented, starting from day –20, both using the abnormal returns calculated with the market model and abnormal returns calculated with the constant mean return model. The impact from the choice of the model to calculate abnormal returns is minimal. Day zero is the announcement date.

It can be seen from Figure 8 that the acquirer average abnormal return in day 0 is quite substantial. The abnormal return before the announcement is minimal as it should be but on the announcement date the abnormal return is under minus two percent. The abnormal return continues to be negative decreasing the CAAR further.

The acquirer average abnormal returns for the event window and the cumulative average abnormal return are shown in Table XIV. The t-values and the statistical significance are also shown. The standard deviation is 0.15 percent and it is calculated from the average abnormal returns of the 200-day estimation period.

Table XIV

Acquirer average abnormal returns

This table shows the daily average abnormal returns and their statistical significances. There are two variables in the table, the average abnormal return (AAR) and the cumulative average abnormal return (CAAR). The statistical significance is calculated with a standard deviation estimated from the estimation period i.e. a 200 trading day period ending ten days before the announcement. The standard deviation of the average abnormal returns is 0.152%. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

Variable	Day	Return	t-value	Significance
AAR	-2	-0.03%	-0.222	0.824
	-1	-0.02%	-0.099	0.921
	0	-2.07% ***	-13.630	0.000
	1	-0.44% ***	-2.872	0.005
	2	-0.26% *	-1.720	0.087
CAAR	0 - +1	-2.50% ***	-11.668	0.000
	-2 - +2	-2.81% ***	-8.293	0.000
	-5 - +5	-3.34% ***	-6.636	0.000

The average abnormal return for the announcement day is two percent. Thus, the average abnormal return for the announcement is substantially negative and also statistically significant. The day after the announcement the acquirer share price still earns an average and statistically significant -0.44 percent return. The cumulative average abnormal return is calculated for three different time periods and the results are shown in Table XIV. The CAAR is statistically significant for all time periods. The two-day CAAR for the acquirer shares,

including the announcement day and the following day, is -2.5 percent. The five-day CAAR (-2 to +2) is -2.8 percent and the 11 day CAAR (-5 to +5) is -3.3 percent. Thus, the merger announcement effect for the acquirer is, on average, around three percent negative. The median market value of the acquirer is $1.4 billion and the costs of the announcement to the shareholders of that company would be over $40 million.

Jensen and Ruback (1983) review many studies of corporate takeovers and report that the bidding firms' shareholders do not suffer losses. Schwert (1996) finds that the average abnormal returns to bidders are not significantly different from zero. Franks et al. (1991) find that transactions financed with stock earn negative abnormal returns whereas cash financed transactions gain slightly. The average acquirer abnormal return in Andrade's (1999) study is -1.8%. Servaes (1991) also finds that acquirer abnormal returns are negative (-1.1%) but using a data from 1972 to 1987, he finds that before the year 1981 the acquirer returns are positive and from 1981 to 1987 the acquirer returns are –3.4%.

5.4 Analysis of CARs

5.4.1 CAARs for different sub-samples

The naïve practitioners' view suggests that EPS accretion or dilution affects abnormal returns. The sample is divided into sub-samples according to the PERELA-variable and the CAARs are calculated separately for these sub-samples. The sample is also divided into sub-samples using other variables that might affect CAARs.

If the PERELA-variable is above one, the transaction is likely to be accretive and if it is below one, the transaction is likely to be dilutive. The sample is divided into sub-samples based on this assumption. The premium affects the EPS accretion or dilution because the P/E-ratio of the target post premium is the P/E-ratio that the acquirer has to actually pay for. Thus, *PERELA1paid* is used and the sample is divided based on the variable being below or above one. Other variables used to divide the whole sample are *Allstock*, *Industry* and *Pooling*. The standard deviation and test statistics are calculated for each sub-sample separately.

The CAARs for the sub-samples are reported in Table XV. All CAARs are statistically different from zero and they are all negative. If *PERELA1paid* is below one (i.e. the target P/E-ratio post premium is bigger than the acquirer P/E-ratio) the CAAR is –2.6 percent. The CAAR for the bootstrap (EPS increasing) transactions is –3.5 percent, resulting in a difference of almost one percent. Although, the difference is not statistically significant, it is still somewhat surprising as it suggest that accretive transactions suffer a more negative loss than the dilutive transactions do.

Other variables used to divide the sample into sub-samples produce interesting results as well. Dividing the sample to stock-for-stock transactions and transactions where other payment methods were used has a large impact on acquirer CAARs. The sub-sample where only stock was used as the method of payment has a 2% lower CAAR and the difference is also statistically significant. Thus, these results support the previous findings from Travlos (1987), Franks et al. (1991), Loughran and Vijh (1997) and Andrade (1999).

If the acquirer and target are in the same industry, the acquirer CAAR is more negative (-3.2%) than if the acquirer and target are in different industries. This result is somewhat surprising, as it is believed that conglomerate mergers perform worse (Jensen (1986)). However, the difference is not statistically significant and the industry sector classifications (using SDC classifications) can distort the results somewhat. Furthermore, the findings are in line with Agrawal et al. (1992).

The accounting method in business combinations seems to be a significant factor affecting acquirer CAARs. The pooling transactions in the sample have a negative CAAR of under minus four percent, whereas CAARs for purchase transactions are over minus two percent negative. The difference is also significant. Previous research showed that the accounting method should not matter as acquirer CAARs for the sub-samples are not different (See Hong et al. (1978) and Davis (1990)). However, the sub-samples are not comparable as the purchase sub-sample includes transactions where the consideration to target shareholders is partially or fully cash. Thus, I believe that the difference of the CAARs for the accounting method sub-samples is caused by the differences in the methods of payment.

Table XV

Sub-sample CAARs

The sample is divided into two sub-samples by using different classifying variables and the CAARs are calculated for these sub-samples. Using the *PERELA1paid*-variable, the sample is divided into transactions where the *PERELA1paid* is below one (i.e. the target P/E-ratio post premium is larger than the acquirer P/E-ratio), and to transactions where the *PERELA1paid* is above one. The standard deviation is calculated similarly as before, but using only the AARs of the sub-samples. The same methods are used when classifying the transactions according to the method of payment (*Allstock*), acquirer and target industry match (*Industry*) and the accounting method used (Pooling). For the industry sector classification, SDC industry sector classification codes are used. The difference of the CAARs for the sub-samples are calculated and the statistical significance of the difference is tested. The statistical significance is an approximate as the standard deviations are estimators. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

Variable		CAAR-2+2	Difference of CAARs	*t*-value	*t*-value of diff.	Standard deviation	N
PERELA1paid	<1	-2.63% ***	0.88%	-7.851	0.881	0.150%	217
	>1	-3.51% ***		-3.727		0.421%	57
All stock	Yes	-3.87% ***	-2.07% ***	-7.522	-3.096	0.230%	134
	No	-1.80% ***		-4.197		0.192%	140
Same industry	Yes	-3.22% ***	-1.06%	-6.688	-1.471	0.215%	168
	No	-2.16% ***		-4.061		0.238%	106
Pooling	Yes	-4.29% ***	-2.53% ***	-7.782	-3.626	0.246%	114
	No	-1.76% ***		-4.125		0.191%	160

5.4.2 Simple OLS regressions

The results of the simple OLS regression are shown in Table XVI. There are only three variables that seem to be statistically significant at the five-percent level, apart from the constant term. These variables are *ALLSTOCK*, *%STOCK* and *POOLING*. They are all very correlated with each other and the result is also expected. Several previous studies show that acquirer returns depend on the method of payment (e.g. Travlos (1987), Franks et al. (1991)). Thus, this study also verifies that the method of payment is highly significant when analysing acquirer announcement period returns.

The *PERELA1paid*-varible is significant on a ten-percent level but the rest of the PERELA-variables are not significant. Interestingly, the signs of most of the PERELA-variables are negative. As the PERELA-variable is the acquirer P/E-ratio divided by the target P/E-ratio, it means that the higher the PERELA-variable is the more accretive the transaction is to acquirer

EPS. The hypothesis according to the naïve practitioners' view is that EPS accretion is positively related to announcement period returns i.e the more accretive the transaction the more positive the market reaction. The negative correlation of CARs and PERELA-variables means just the opposite.

Table XVI

Announcement period abnormal returns – simple OLS regressions

Each variable shown in the first column is the independent variable in an OLS regression, where the dependent variable is the cumulative abnormal return (CAR). Constant is the intercept (α) and beta is the slope (β) of the regression model $CAR_i = \alpha + \beta \times variable_i + \varepsilon_i$. The regression is run using all the PERELA-variables and the control variables. The PERELA-variable is the acquirer P/E-ratio divided by the target P/E-ratio. *PERELA1* is calculated using acquisition year's EPS estimates and *PERELA2* is calculated using EPS estimates of the next fiscal year. *PERELA1-1* is calculated one day prior to the announcement and *PERELA1-10* is calculated ten days prior to the announcement. PERELA1paid- and PERELA2paid-variables are calculated using the share price offered to target shareholders in the acquisition. *SIZE* is the relative size of the acquirer and target market values. Acquirer M/B is the acquirer M/B-ratio one day prior to the announcement. *Prem%-1* is the premium paid to target shareholders over last previous day's closing price. *%STOCK* is the percentage of stock used as payment method and *All stock* is a dummy variable that gets the value of one if the transaction is 100% stock-for-stock and zero otherwise. Pooling is a dummy variable that gets the value of one if the accounting choice is pooling and zero if it is purchase. Industry is a dummy variable that gets the value of one if the acquirer and target are in the same industry sector and a value of zero if the acquirer and target are in different industry sectors. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

			t-value			
Variable	Constant	Beta	Constant	Beta	R2	N
PERELA1paid	-1.378	-1.624 *	-1.490	-1.760	0.011	273
PERELA2paid	-1.279	-1.921	-1.064	-1.472	0.008	255
PERELA1-1	-1.937 **	-0.804	-2.073	-1.092	0.004	274
PERELA1-10	-1.937 **	-0.743	-2.036	-1.063	0.004	273
PERELA2-1	-2.907 ***	0.017	-4.138	0.039	0.000	255
PERELA2-10	-2.961 ***	0.020	-4.355	0.053	0.000	255
SIZE	-2.876 ***	0.179	-4.117	0.126	0.000	274
Acquirer M/B	-3.153 ***	0.169	-4.991	0.976	0.004	250
Prem%-1	-2.888 ***	0.217	-5.750	0.519	0.001	274
%STOCK	-0.730	-0.034 ***	-0.910	-3.208	0.036	274
ALLSTOCK	-1.798 ***	-2.073 **	-2.697	-2.174	0.017	274
POOLING	-1.760 ***	-2.527 ***	-2.833	-2.624	0.025	274
INDUSTRY	-2.164 ***	-1.057	-2.806	-1.073	0.004	274

Interestingly, the coefficients of the *PERELA2*-variables, which are calculated using next year's EPS estimates are positive, but practically zero i.e. they do not correlate with CARs. One would expect that investors focus more on the longer term earnings impact and not the effect on the same fiscal year's earnings. However, if companies are playing the bootstrap game, they are likely to focus on the effect the merger has on the reported earnings in the near future. Andrade (1999) found a positive correlation of EPS accretion and announcement period CARs.

The relative size of the target and acquirer does not correlate statistically significantly with CARs. The size variable should not affect acquirer returns significantly but it affects the EPS accretion or dilution so it has to be controlled in multiple OLS regressions. The acquirer M/B-ratio is used as a proxy for the Tobin's q, which has been found to affect acquirer returns. Table XVI shows that the acquirer M/B-ratio does not correlate with announcement period returns significantly.

CARs do not correlate significantly with the premium paid to target shareholders. This is expected as the premium in itself is not a sign of overpayment. The premium was neither statistically significant in Andrade's (1999) regressions. The *INDUSTRY*-variable, controlling for the strategic fit of the acquirer and target does not correlate significantly with acquirer returns. However, the sign is negative implying that if the acquirer and target are in the same industry sector, the acquirer abnormal returns are more negative than if the acquirer and target are in different industry sectors.

The simple OLS regressions are not that interesting, as basically they inform us only of the correlation between one variable and the acquirer CARs. Next, acquirer CARs are analysed using multiple OLS regressions, which better reveal the dependence of CARs and the studied variables.

5.4.3 Multiple OLS regressions

The most important and interesting analysis in this study is to test the dependence of CARs on the PERELA-variable. This is best done using a multiple OLS regression analysis where the PERELA-variable and the control variables are regressed against CARs. The results of the

multiple OLS regression analysis are shown in Table XVII. There are six different regressions reported in Table XVII to be able to show the dependence with different models. The number of observation included in the regression varies with the availability of variables from 249 to 274. The acquirer cumulative abnormal return is the dependent variable in all regressions.

The regression was tested with several PERELA-variables and the strongest correlation was with the *PERELA1paid-* and *PERELA1*$_{-1}$-variables. The *PERELA2*-variables, calculated using the EPS estimates of the fiscal year following the acquisition were not statistically significant. Thus, the regressions reported in Table XVII are using either the *PERELA1paid*-variable or the *PERELA1*$_{-1}$-variable. The R^2 in all regressions is low, varying from 3.8% to 5.0%. The F-values for all the regressions are significant at least at the ten percent level. Thus, the dependence is not strong and in some cases the model does not seem to fit well at all.

The independent variables included in the first regression are the *PERELA1paid-* and *%Stock*-variables. The *%Stock*-variable is highly significant but the *PERELA1paid*-variable is not. Including more control variables in the second regression does not do much to improve the fit of the model. When using the *Allstock*-dummy instead of the percentage of stock used as payment method (fifth regression), the statistical significance of the payment method decreases but it is still statistically significant at the ten-percent level. All regressions are quite similar except for the last one. The PERELA-variable is not statistically significant but the t-value is not that low. The *PERELA1*$_{-1}$-variable seems to be less significant compared to the *PERELA1paid*-variable. The most interesting result in Table XVII is that the sign of the coefficients of all the reported PERELA-variables are negative. The negative signs of the PERELA-variables contradict the naïve practitioner's view –hypothesis as the negative sign means that the higher the acquirer P/E-ratio is in relation to the target P/E-ratio, the more negative the acquirer abnormal return is. The P/E-ratio relative affects EPS accretion and Andrade (1999) found that CARs are positively dependent on EPS accretion.

The acquirer M/B-ratio is not significant in any regressions but the sign is positive, which is as expected (Lang et al. (1989) and Servaes (1991) find that Tobin's q positively affects acquirer returns). The sign of *SIZE* is negative, i.e. the larger the target is in relation to the acquirer the more negative the acquirer CAR is. *SIZE* is not statistically significant but the sign seems logical, as the relative size magnifies any effects i.e. the larger the target the larger will be the impact on acquirer returns. The *Industry*-variable is not statistically significant in

any regression but the t-statistic is quite high (-1.5). The sign of the *Industry*-variable is negative, which means that conglomerate mergers have a positive effect on acquirer returns. This is also in line with Agrawal et al. (1992), who find that conglomerate mergers perform better. The premium paid to target shareholders is not statistically significant but the sign is positive. The premium is only included in regressions that include the *PERELA1paid*-variable as the correlation of these variables is quite high and *PERELA1paid* already includes the premium. The sign is slightly surprising as it is positive, but it supports the hypothesis that premium is not considered as a sign of overpayment, contradicting Andrade's (1999) belief.

The last regression in Table XVII is quite interesting, as the *PERELA1paid*-variable is significant at the ten-percent level. The regression does not include the payment method variable but it includes the *Pooling* dummy. *Pooling* is correlated with the payment method but it is not correlated with the PERELA-variables. Thus, this regression implies that the P/E-ratio relative is negatively correlated with acquirer returns and if the merger is accounted for as pooling, the acquirer returns are more negative compared to purchase accounting. The negative effect of pooling accounting can be explained by the fact that the transactions accounted for as pooling are mostly stock-for-stock transactions and the other regressions show that the payment method significantly affects acquirer CARs.

Analysing the coefficient of the PERELA-variables in the simple OLS regression in Table XVI and the multiple OLS regressions Table XVII, it can be observed that by including the payment method as a control variable decreases the significance and the size of the coefficient. The variables are somewhat correlated (16%) and there might be a problem of multicollinearity.

The pooling accounting method in business combinations is no longer allowed in the US. Practitioners also claim that pooling is beneficial as it usually reports higher EPS figures. Thus, the sample is divided into two sub-samples, the first one including only transactions accounted for as purchase and the second one including all transactions accounted for as pooling. The results are presented in Table XVIII.

Table XVII

Announcement abnormal returns - multiple OLS regressions

The table shows the results from six different multiple OLS regressions where the dependent variable is the cumulative abnormal return and the independent variables are a form of the PERELA-variable, either *PERELA1paid* or *PERELA1-1* and control variables such that the multiple OLS regression gets the form of: $CAR = \alpha + \beta_1 \times PERELA1_t + \sum \beta_i \times CONTROL_i + \varepsilon$. The *PERELA1*-variables are defined as the acquirer P/E-ratio divided by the target P/E-ratio, where the P/E-ratios are calculated using the fiscal year estimates for the acquisition year. *PERELA1-1* is calculated using prices one day prior to the announcement and *PERELA1paid* uses the price paid to target shareholders in the target P/E-ratio. The control variables used are %STOCK, all stock (dummy), acquirer market-to-book –ratio, SIZE, premium paid, industry (dummy) and pooling (dummy). Each column, indicated by numbers one to six on row two, show the values of the regression coefficients, i.e. the values of α, β_1, β_2... T-statistics for each variable are below the value in parenthesis. The R^2 and the F-value of each regression is shown on the bottom of each column. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

	PERELA1paid		PERELA1-1		PERELA1paid		Expected
	[1]	[2]	[3]	[4]	[5]	[6]	sign
Constant	0.191	0.743	-0.245	0.488	0.245	0.161	
	(0.181)	*(0.543)*	*(-0.229)*	*(0.342)*	*(0.184)*	*(0.122)*	
PERELA1paid	-1.180	-1.242			-1.514	-1.637 *	+
	(-1.28)	*(-1.269)*			*(-1.556)*	*(-1.687)*	
PERELA1-1			-0.501	-0.818			+
			(-0.684)	*(-0.936)*			
%STOCK	-0.032 ***	-0.028 **	-0.033 ***	-0.028 **			-
	(-2.973)	*(-2.457)*	*(-3.083)*	*(-2.469)*			
All stock					-1.899 *		-
					(-1.891)		
Acquirer M/B		0.238		0.253	0.255	0.233	+
		(1.372)		*(1.437)*	*(1.450)*	*(1.334)*	
SIZE		-1.019		-1.141	-0.967	-0.782	
		(-0.686)		*(-0.766)*	*(-0.648)*	*(-0.526)*	
Prem%-1				0.405			-
				(0.896)			
Industry		-1.444		-1.574	-1.580	-1.546	
		(-1.413)		*(-1.531)*	*(-1.539)*	*(-1.507)*	
Pooling						-1.901 *	0
						(-1.884)	
R2	0.043	0.050	0.038	0.049	0.040	0.040	
Adjusted R2	0.036	0.030	0.031	0.025	0.020	0.020	
F-value	6.014	2.536	5.368	2.082	2.031	2.025	
Sig. of F	0.003	0.029	0.005	0.056	0.075	0.076	
N	273	249	274	250	250	249	

Table XVIII

OLS regressions - sample divided to pooling and purchase transactions

The sample in this table is divided to transactions depending on the accounting method i.e. if the merger is accounted for as pooling or purchase. The table shows the results from four different multiple OLS regressions using the sub-samples. The first three regressions include only transactions that are accounted for as purchase and the fourth regression includes pooling transactions only. The dependent variable in all regressions is the cumulative abnormal return and the independent variables are a form of the PERELA-variable, either PERELA1paid or PERELA1-1 and control variables such that the multiple OLS regression gets the form of: $CAR = \alpha + \beta_1 \times PERELA1_t + \sum \beta_i \times CONTROL_i + \varepsilon$. The *PERELA1*-variables are defined as the acquirer P/E-ratio divided by the target P/E-ratio, where the P/E-ratios are calculated using the fiscal year estimates for the acquisition year. *PERELA1-1* is calculated using prices one day prior to the announcement and *PERELA1paid* uses the price paid to target shareholders in the target P/E-ratio. The control variables used are %STOCK, all stock (dummy), acquirer market-to-book –ratio, SIZE, premium paid, industry (dummy) and pooling (dummy). Each column, indicated by numbers one to six on row two, show the values of the regression coefficients, i.e. the values of α, β_1, β_2... T-statistics for each variable are below the value in parenthesis. The R^2 and the F-value of each regression is shown on the bottom of each column. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

	NO POOLING			ONLY POOLING	
	[1]	[2]	[3]	[4]	Expected
Constant	2.289	1.936	2.040	-5.968 **	
	(1.410)	*(1.116)*	*(1.175)*	*(-2.119)*	
PERELA1paid	-2.385 **			4.778 *	+
	(-2.307)			*(1.862)*	
PERELA1-1		-1.697 *	-1.211		+
		(-1.779)	*(-1.383)*		
%STOCK	-0.032 **	-0.033 **	-0.035 **		-
	(-2.191)	*(-2.236)*	*(-2.394)*		
All stock					-
Acquirer M/B	0.053	0.106	-0.026	0.218	+
	(0.150)	*(0.284)*	*(-0.072)*	*(1.052)*	
SIZE	-0.816	-0.974	-1.245		
	(-0.483)	*(-0.572)*	*(-0.735)*		
Prem%-1		0.580		-6.466	-
		(1.268)		*(-1.509)*	
Industry	-1.233	-1.357	-1.244	-1.396	
	(-0.971)	*(-1.056)*	*(-0.968)*	*(-0.846)*	
R2	0.094	0.083	0.073	0.085	
Adjusted R2	0.062	0.044	0.040	0.046	
F-value	2.969	2.145	2.243	2.196	
Sig. of F	0.014	0.052	0.053	0.075	
N	149	149	149	100	

The first three regressions in Table XVIII are regressions from the sub-sample including only purchase transactions and the last regression is from the pooling sub-sample. The results in the first three regressions show that the percentage of stock used in the regression significantly affects CARs. The results in regressions one and two show that the PERELA-variable is also statistically significant. The signs of the coefficients of all PERELA-variables in the purchase transaction sub-sample are negative as in the pooled sample. Other variables are not statistically significant, but the t-values for the *Premium* in regression 2 and the *Industry*-dummy are quite high.

In the regression containing the transactions from the pooling sub-sample (regression 4), the only significant variables are the constant term and the *PERELA1paid*-variable. Interestingly, the sign for the *PERELA1paid*-variable is positive, which is in line with the naïve practitioners' hypothesis.

The results presented in Table XVIII are slightly confusing. It seems that if the transaction is accounted for as pooling, EPS accretion has a positive effect on acquirer abnormal returns but if the transaction is accounted for as purchase, EPS accretion has a negative impact on acquirer returns. The pooling and purchase sub-samples are not similar and cannot be compared directly. The pooling accounting transactions are mostly stock-for-stock transactions, whereas the purchase accounting sub-sample includes transaction where the payment method is either all cash, all stock or mixed. The previous analyses showed that the method of payment is the most significant variable impacting CARs. Furthermore, one of the criteria of pooling was that the companies have to be similar in size. Thus, the pooling sub-sample includes only transactions where the principal method of payment is stock and where the target and acquirer are of similar size.

5.4.4 Discussion of regression results

The PERELA-variable significantly affects acquirer announcement period returns. The relationship is interesting as the larger the acquirer P/E-ratio in relation to the target P/E-ratio, the more negative is the market reaction. This result contradicts the findings of Andrade (1999) and the naïve practitioners' view. Next, the possible reasons for the interesting results are discussed.

Table XIX

Correlation for sub-sample including only purchase transactions

This table shows the correlation of the main variables from the sub-sample that includes only transactions, which are accounted for using the purchase method. The sample size is 159 transactions. *PERELA1paid* is the acquirer P/E-ratio one day before the announcement divided by the target P/E-ratio post premium. *PERELA1*$_{-1}$ is the acquirer P/E-ratio divided by the target P/E-ratio, both one day before the announcement. *Prem%-1* is the premium paid to target shareholders over last previous day's closing price. *%STOCK* is the percentage of stock used as payment method. *SIZE* is the relative size of the acquirer and target market values. Industry is a dummy variable that gets the value of one if the acquirer and target are in the same industry sector and a value of zero if the acquirer and target are in different industry sectors.

	PERELA1paid	PERELA1-1	Prem%	%STOCK	SIZE	Industry
PERELA1paid	1.000					
PERELA1-1	0.899	1.000				
Prem%	-0.276	0.017	1.000			
%STOCK	0.188	0.187	-0.068	1.000		
SIZE	0.124	0.080	-0.179	-0.124	1.000	
Industry	0.054	0.031	0.010	0.134	-0.030	1.000

One possible explanation to these interesting results is the correlation of the two most important variables, namely the PERELA-variable and the percentage of stock used in the transaction. The regression model might suffer from multicollinearity as the PERELA-variables and the *%Stock*-variable are correlated. The correlation for the purchase sub-sample is shown in Table XIX. The correlation between these variables does not seem to be too high as it is under twenty percent but it might still create problems. The reason for the correlation is an interesting issue, namely, the correlation implies that companies are trying to apply the practitioners' view in another sense. Managers believe that when their stock is valued higher i.e. their P/E-ratio is high, it is worth using stock in transactions in stead of cash. This idea has been presented in recent capital structure studies. Baker and Wurgler (2002) claim that capital structure results from trying to time the equity market, i.e. issuing stock when valuation is high. Welch (2002) supports this hypothesis and finds that companies do not optimise capital structure, and capital structure is merely a result of stock returns. This applies to mergers and acquisitions as well. Shleifer and Vishny (2001) claim that companies use stock as payment method when the company is overvalued. Thus, the negative relationship of the P/E-ratio relatives and acquirer CARs might result from the fact that overvalued acquirers use more stock than cash to finance the transaction. This hypothesis can be tested with a multinomial logistic regression model. If the likelihood of using cash is related to the *PERELA*-variable, the relative valuation matters when choosing the payment method.

Table XX

Multinomial logit regression on the method of payment

The table shows the results of a multinomial logit regression. The dependent variable is the payment method, which can take three values 0, 1 and 2 (Cash, other and stock respectively). Stock as payment method is the reference category. The coefficient of each independent variable is reported in the columns and the Wald statistic for the significance of the variable are reported in brackets below the coefficient. The payment method is regressed on *PERELA1-1*, *Acquirer M/B*-ratio, *SIZE* and *PREM%*. *PERELA1-1* is the acquirer P/E-ratio divided by the target P/E-ratio, calculated one day prior to the announcement and using the EPS estimates for the announcement year. SIZE is the market value of the target divided by the market value of the acquirer. *PREM%-1* is the premium paid over the target's closing share price one day prior to the announcement. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

	CASH	OTHER
Intercept	-0.415	-0.299
	(0.516)	*(0.505)*
PERELA1-1	-1.228 **	-0.022
	(6.076)	*(0.008)*
Acquirer M/B	-0.014	-0.218 **
	(0.017)	*(5.156)*
SIZE	0.723	0.677
	(1.696)	*(2.238)*
Prem%-1	1.165 *	0.946
	(3.730)	*(2.608)*
Nagelkerke's R-Square	0.100	
Chi-square	22.778	
Sig. of F	0.004	
N	249	

The results of the multinomial logit regression are shown in Table XX. The dependent variable can take three values: 0,1 and 2 (cash, other and stock respectively). The independent variables used in the model are the *PERELA1.$_1$*-variable, the *Acquirer M/B*-ratio, the relative market values of the acquirer and target and the premium paid to target shareholders. The results show that the relative P/E-ratio (*PERELA1.$_1$*) has a negative effect on the choice of stock as the payment method. It is also statistically significant. However, the relative P/E-ratio does not statistically significantly affect the choice of other payment methods, but the acquirer M/B-ratio does, implying that acquirer valuation is important. Thus, the results support the hypothesis that acquirer valuation has an impact on the payment method. If the acquirer

valuation is higher in relation to the target or higher in general, the payment method is more likely to be stock than cash or other payment methods. Using stock as the method of payment results in significantly lower CARs. Thus, the negative relationship of the P/E-ratio relative (PERELA) and CARs could be explained by the fact that if the PERELA-variable is higher it is more likely that the payment method is stock and thus the lower returns. Premium is also statistically significant in cash transactions. Huang and Walkling (1987) show that returns to target shareholders are bigger for cash deals, so the result is in line with their finding.

Another explanation for the results in Table XVIII is the hypothesis presented by Harding and Yale (2002). They hypothesise that the market reaction towards EPS dilution is not negative as EPS dilution brings discipline to the management. Managers making accretive transactions can report an increasing EPS without any work, whereas managers making dilutive transactions have to work harder to achieve growing EPS figures. The hypothesis does explain why the coefficient for the PERELA-variable in the whole sample is negative, but it does not explain why the coefficient is positive in the pooling sub-sample and negative in the purchase sub-sample. A reason could be that pooling transactions are more transparent and it is easier to determine the effect on EPS and thus the EPS accretion is positive. In purchase transactions, there are so many factors affecting the change in EPS. Goodwill amortisation or extra depreciation can be used to even out changes in EPS, making it more difficult for investors to determine if the management is doing a good job. Thus, more discipline for managers is preferred. However, this explanation seems somewhat unlikely.

5.4.4 Robustness checks for multiple OLS regressions

To test the robustness of the regression results the regressions were run using different PERELA-variables and also by setting other restrictions to the data in order to be able to remove outliers. The results of the most important robustness checks are presented in Table XXI. The table presents six different regressions. The first four regression are regressions where further restrictions are set to the sample transactions and the last two regressions use other PERELA-variables not reported previously.

The original restriction in the sample was that the P/E-ratios of the acquirer and target companies should not exceed 150. A P/E-ratio of 150 is quite high, even though it was quite

normal especially for high technology companies to have high P/E-ratios in the end of the 1990s. All transactions where the P/E-ratio of the target or acquirer was above 50 were removed from the sample. Furthermore, the PERELA-variable was limited so that all PERELA-variables that were above four were removed from the sample to ensure that the results are not driven by a few outliers. These restrictions decreased the sample size to 251 transactions. The regressions were run again after these restrictions and the results are the first three regressions in Table XXI. The results do not differ much. All the coefficients of the PERELA-variables are negative. Surprisingly, *PERELA1*$_{-1}$, which was not statistically significant in the previous pooled regression in Table XVII and had low t-values, is now statistically significant at the ten percent level. *%Stock* is again clearly statistically significant.

Next, all transactions that were accounted for using the pooling method were removed from the restricted sample. The same regression was run using this sample that included 152 transactions and the *PERELA1*$_{-1}$-variable. The regression result is the fourth regression in Table XXI. The coefficient for the PERELA-variable is actually larger and it is statistically significant at the five percent level, although, the regressions presented do not include exactly the same control variables. %Stock is also statistically significant. An interesting observation is that when restricting the sample for these robustness checks, it does not affect the t-values of the *PERELA1paid*-variable much, but the *PERELA1*$_{-1}$-variable is suddenly statistically significant.

The robustness of the results was also checked using different PERELA-variables. First, the PERELA2-variable was used instead of the PERELA1-variables. The expectation was that the results are similar to that of the PERELA1-variable or even stronger as one should think that investors focus more on long term earnings than on the short term. The regressions were run using the complete sample and using the *PERELA2*$_{-1}$-variable and control variables as the independent variables and CARs as the dependent variables. The results were in line with the previous results. *PERELA2*$_{-1}$ was negative but not statistically significant and the only statistically significant variable was the method of payment (*%Stock*).

Table XXI

Robustness checks – multiple OLS regressions

Any possible outliers are removed in regressions one to three (Companies with P/E-ratios of over 50 (previously 150) and transactions where the relative P/E-ratio is over 4 are removed). The fourth regression is further restricted using the previous restrictions and then removing all pooling transactions. The fifth regression uses the *PERELA2-1* as one of the dependent variables and regression six uses the natural logarithm of the *PERELA1-1*-variable as one of the independent variables. The dependent variable in all regressions is the CAR and the independent variables are a form of the PERELA-variable, and control variables such that the multiple OLS regression gets the form: $CAR = \alpha + \beta_1 \times PERELA1_t + \sum \beta_i \times CONTROL_i + \varepsilon$. The *PERELA1*-variables are defined as the acquirer P/E-ratio divided by the target P/E-ratio, where the P/E-ratios are calculated using the fiscal year estimates for the acquisition year. *PERELA1-1* is calculated using prices one day prior to the announcement and *PERELA1paid* uses the price paid to target shareholders in the target P/E-ratio. *PERELA2-1* is calculated using the following year's EPS estimates. The control variables used are %STOCK, all stock (dummy), acquirer market-to-book –ratio, SIZE, premium paid, industry (dummy) and pooling (dummy). Each column, indicated by numbers one to six on row two, show the values of the regression coefficients, i.e. the values of α, β_1, β_2... T-statistics for each variable are below the value in parenthesis. The R^2 and the F-value of each regression is shown on the bottom of each column. *=significant at 10% level, **=significant at 5% level, ***significant at 1% level.

	ALL EXCLUDING OUTLIERS			AND POOLING	OTHER PERELAs	
	[1]	[2]	[3]	[4]	[5]	[6]
Constant	1.281	2.046	2.221	3.094 *	0.417	-1.870 ***
	(0.942)	*(1.491)*	*(1.387)*	*(1.908)*	*(0.417)*	*(-2.783)*
PERELA1paid	-1.566		-1.865			
	(-1.137)		*(-1.329)*			
PERELA1-1		-2.001 *		-2.967 **		
		(-1.859)		*(-2.215)*		
PERELA2-1					-1.170	
					(-0.954)	
ln PERELA1-1						-0.882
						(-0.895)
%STOCK	-0.029 ***	-0.029 ***	-0.030 ***	-0.028 **	-0.026 **	
	(-2.850)	*(-2.847)*	*(-2.944)*	*(-2.014)*	*(-2.203)*	
All stock						-1.993 **
						(-2.081)
Acquirer M/B					0.275	
					(1.525)	
SIZE					-1.194	
					(-0.763)	
Prem%-1			-2.275			
			(-1.111)			
Industry	-1.282	-1.294	-1.266	-0.682	-1.550	
	(-1.385)	*(-1.404)*	*(-1.368)*	*(-0.557)*	*(-1.430)*	
R2	0.053	0.062	0.058	0.074	0.044	0.020
Adjusted R2	0.042	0.050	0.043	0.055	0.023	0.013
F-value	4.643	5.401	3.794	3.929	2.083	2.762
Sig. of F	0.004	0.001	0.005	0.010	0.069	0.065
N	251	251	251	152	230	274

Finally, as the PERELA-variable is not perfectly normally distributed, but rather lognormally distributed (see Figure 6), there might be a problem of heteroscedasticity. Although, the problem is not likely to be important, the regression was run using the natural logarithm of the *PERELA1*$_{-1}$-variable. Also, the *Allstock*-dummy was used in this regression instead of the *%Stock* as *Allstock* is less correlated with the PERELA-variables. The results, presented in the last column of Table XXI did not differ from the original results.

The conclusion from the robustness checks is that the different tests did not significantly change the results.

5.5 Summary of empirical results

The first part of the empirical results was to analyse the acquirer and target P/E-ratios and the P/E-ratio relative. The hypothesis was that companies follow the naive practitioners' view in the acquisition process and acquire other companies with lower P/E-ratios to achieve EPS accretion. This, however, was not the case in this sample. The acquirer P/E-ratios where distributed similarly as the target P/E-ratios and the average and median P/E-ratios were similar. Also, the P/E-ratio relative, i.e. the PERELA-variable was distributed around one before the premium. Thus, companies acquire other companies, which have similar P/E-ratios before the premium. There was also a strong linear relationship with acquirer and target P/E-ratios. Using EPS estimates for the year following the acquisition did not change the situation. Furthermore, post the premium paid to target shareholders, the mean target P/E-ratio was much higher than the acquirer P/E-ratio, signaling that acquirers make, on average, dilutive transactions.

Next, the acquirer cumulative announcement period returns were calculated and analysed. The acquirer cumulative average abnormal return (CAAR) was significantly negative at the announcement. Using a short five-day event window (-2 to +2), I found that the CAAR was almost three percent negative (-2.8%). Dividing the sample to sub-samples on the basis of the PERELA-variable and control variables showed that the CARs for bootstrap transactions are lower but not statistically significant. Dividing the sample by the method of payment showed that when paying with stock abnormal returns are much lower.

Finally, the relationship between cumulative abnormal returns and the P/E-ratio relative was analysed. The hypothesis was – in line with the naïve practitioners' view – that CARs are positively dependent of the P/E-ratio relatives, i.e. the higher the acquirer P/E-ratio is in relation to the target P/E-ratio, the more positive is the acquirer abnormal return. Surprisingly, this was not the case. In a multiple OLS regression, the coefficient of the PERELA-variables was negative and when controlling for the accounting method, *PERELA1paid* was found statistically significant. This result contradicts the findings of Andrade (1999).

The cross-sectional dependence was analysed further by dividing the sample into two sub-samples depending on the accounting method (pooling or purchase). The results showed that in the pooling sub-sample, the P/E-ratio relative has a positive effect on CARs, but in the purchase sub-sample, the relationship is negative. It was further hypothesised that the negative reaction in the pooling sub-sample is a result of companies with higher valuation using more stock as the method of payment. This hypothesis was tested using a multinomial logit regression model and the results supported the hypothesis that valuation impacts the method of payment.

6 CONCLUSION

Brealey and Myers (2000) describe the bootstrap game as a dubious reason for mergers. Playing the bootstrap game, a company can increase its reported EPS figures. The naïve practitioners' view suggests that the increase in EPS will transform into an increase in the acquirer's share price. Practitioners believe that a company should not buy another company with a higher P/E-ratio as it results in EPS dilution. Financial theory tells us that it is not accounting EPS or P/E-ratios that are used to value a company. Cash is king. It is cash flow that matters.

The first part of this study reviewed the theory and previous research relating to the bootstrap game. Even though the issue is discussed in several financial textbooks and the practitioners' view can be observed in newspapers, there are not many academic studies that focus on the matter. The results from the previous research is mixed and one claims that an increase in EPS results in higher acquirer CARs (Andrade (1999)) as the other claims that EPS dilution is actually better (Harding and Yale (2002)). Studies looking at the choice of pooling versus purchase accounting seem to conclude that pooling accounting, which reports higher EPS figures, cannot improve acquirer returns. However, it seems that managers prefer pooling and are even willing to incur extra costs to qualify for pooling, documenting the existence of the naïve practitioners' view.

The first objective of the study was to look at the acquirer and target P/E-ratios and to study the P/E-ratio relatives. If the practitioners' view hypothesis is true, it should be observable that companies acquire other companies with lower P/E-ratios. Thus, P/E-ratios of target companies should be much lower than the P/E-ratios of acquirers. Furthermore, the P/E-ratio relative, i.e. the acquirer P/E-ratio divided by the target P/E-ratio, should be distributed above one. However, this was not the case. The P/E-ratios of the acquirer and target samples were very similarly distributed, with almost equal means and medians. The P/E-ratio –relative pre acquisition premium (PERELA) was also distributed around one. Surprisingly, there was a strong linear relationship between acquirer and target P/E-ratios. The mean P/E-ratio of the target and acquirer shareholders was statistically significantly different only when comparing the P/E-ratios post the acquisition premium. Even then, the mean acquirer P/E-ratio was substantially lower than the target P/E-ratio. The results contradict the naïve practitioners'

view and it seems that companies acquire other companies with similar P/E-ratios. It might be that this is because of the fact that companies in the same industry trade at same P/E-ratios, but controlling for conglomerate or horizontal acquisitions did not change the result.

Result 1: Average acquirers do not play the bootstrap game i.e. acquire companies with lower P/E-ratios

The acquirer cumulative average abnormal returns for the announcement period were found negative and statistically significant. The sample was divided to different sub-samples according to the relative P/E-ratios, the payment method, horizontal or conglomerate acquisition and the method of accounting. The conclusion from the results was that the only clear and statistically significant variable affecting the CAARs is the method of payment.

Result 2: Acquirer cumulative average abnormal returns are negative

Result 3: The method of payment statistically significantly affects acquirer abnormal returns

The acquirer cumulative abnormal returns were analysed further using OLS regression analysis and a few interesting results were found. The P/E-ratio relatives did not seem to correlate with acquirer returns very significantly. The payment method was found significant in all regressions, verifying the results of the CAAR subs-sample comparisons. The initial sample was divided into two sub-samples according to the accounting method used in the business combination. The P/E-ratio relative (PERELA) did affect CARs negatively in the sub-sample of transactions using the purchase accounting method. The results were statistically significant. The P/E-ratio relative (PERELA) had a marginally positive effect on acquirer CARs in the pooling sub-sample.

Result 4: The P/E-ratio relative has a negative effect on CARs in purchase transactions.

Result 5: The P/E-ratio relative has a marginally positive effect on CARs in pooling transactions.

These results were fairly surprising as the hypothesis according to the naïve practitioners' view was that the P/E-ratio relative has a positive effect on CARs. The results also contradict Andrade's (1999) results, but are more in line with the findings of Harding and Yale (2002) and Rau and Vermaelen (1998). The findings for the pooling sub-sample are in line with the naïve practitioners' view, although the evidence is very weak. The differences in the sub-samples can possibly explain the differing results. The pooling sub-sample includes only transactions where the method of payment is primarily cash and where the target and acquirer are of similar size. Furthermore, pooling transactions do not report goodwill or extra depreciation so the transaction's impact on acquirer EPS is easy to calculate. The purchase sub-sample is quite different as it includes all kinds of payment methods and all kinds of companies. The impact on EPS is not as straightforward as in the pooling method as the purchase accounting method requires any extra consideration to be recorded as goodwill or as an asset step up. Thus, when the companies are of similar size and the transaction is straightforward, EPS accretion can have a marginally positive effect on acquirer returns. In more complex transactions it was hypothesised that the valuation of the acquirer and target is related to the method of payment. The multinomial logit regression showed that the higher the acquirer is valued the more likely the transaction is to be financed with stock.

Result 6: Acquirer valuation affects the method of payment

The correlation of the method of payment and valuation is a possible and likely explanation to the negative relation of relative P/E-ratios and CARs.

There are several further research possibilities. The first possibility is the long-term performance of dilutive versus accretive firms. Another possibility is to focus more on the relative and absolute valuations of the acquirer and target and how these affect acquirer and target abnormal returns. A third possibility is to calculate the exact EPS accretion or dilution, also in the long term thus including also loss-making targets and to analyse CARs with that data. The implications of the changes in the capital structure due to different methods of payment could also be interesting to study.

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